

THE LEGISLATIVE FRAMEWORK PERTAINING TO SEABIRD REHABILITATION CENTRES IN SOUTH AFRICA: IMPORTANCE TO SEABIRD CONSERVATION

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ABSTRACT

Seabird rehabilitation centres play a critical role in the conservation of seabirds in South Africa. There has been an increase in the decline of seabirds globally including in South Africa, mainly from anthropogenic activities. Seabird rehabilitation centres have occupied a niche responsibility that was previously unoccupied in society. In this, they have demonstrated immense capability in contributing to seabird conservation, by treating distressed, ill, injured or orphaned seabirds with the aim of releasing them back into the wild. Despite these conservation efforts, the environmental legislation has been lagging in respects of regulating seabird rehabilitation centres. This study, therefore, aimed to investigate how environmental legislation can help improve the management of seabirds in rehabilitation, to strengthen conservation efforts; reviewed the understanding of the environmental legislative framework for seabird rehabilitation in South Africa and also examined policy options for improving the state of seabird rehabilitation centres, to promote seabird conservation in South Africa. The data on the conservation functions and responsibilities of seabird rehabilitation centres in South Africa was obtained through the use of a semi-structured questionnaire. The questionnaire was comprised of five sections titled “General, Collection of Animals, The Release, Finance and Legislative Requirements”. The study confirmed that seabird rehabilitation centres do play a critical role in the conservation of seabirds. However, there are operational challenges in fulfilling this role. The study also confirmed that there is minimal government support and that the legislation regulating seabird rehabilitation centres still does not fully address challenges experienced by the seabird rehabilitation centres. The study also acknowledges that there are attempts by the Department of Environmental Affairs, in revising its policies and rationalising its legislation, to minimise fragmentation of legislation regulating seabird rehabilitation centres. The study concludes that a clear policy objective and intervention will address key issues affecting seabird rehabilitation centres and will ensure the reform of this sector. The recommendations of the study state that other policy tools, such as Norms and Standards, can be used to provide much-needed guidelines. A rigorous process involving both rehabilitators and government officials is required to improve the level

of competence. The government must also recognise the need for coordination with state entities and organisations with the necessary skills to augment the staff capacity constraint. Furthermore, alignment of legislation to minimize duplication and identify economic instruments to incentivise seabird rehabilitation centres is needed. Lastly, strategic locations within the country and the threshold on the number of seabird rehabilitation centres needs to be identified, to prevent the proliferation of facilities that compete for an already strained financial resource.

ABSTRAK

Seevoël-rehabilitasiesentrums speel 'n kritiese rol in die bewaring van seevoëls in Suid-Afrika. Daar is 'n toename in die vermindering van die seevoël-bevolking wêreldwyd, insluitende Suid-Afrika, hoofsaaklik weens antropogeniese bedrywighede. Seevoël-rehabilitasiesentrums het 'n nis-verantwoordelikheid vervul wat voorheen in die samelewing afwesig was. Hierdie nis-verantwoordelikheid het ontsaglike vermoë openbaar om by te dra tot die bewaring van seevoëls deur gestresde, siek, beseerde of wees seevoëls te behandel met die doel om hulle weer in die natuur terug te plaas. Ondanks hierdie bewaringspogings, het omgewingswetgewing om seevoël-rehabilitasiesentrums te reguleer, egter agterweë gebly. Hierdie studie het dus ten doel om ondersoek in te stel na hoe omgewingswetgewing kan help om die bestuur van seevoël-rehabilitasie te verbeter, ten einde bewaringspogings te versterk. Hierdie studie kyk ook oorsigtelik na die begrip van die wetlike raamwerk rondom omgewingsake vir die rehabilitasie van seevoëls in Suid-Afrika. Die data van die funksies en verantwoordelikheid van bewaring van seevoël-rehabilitasiesentrums in Suid-Afrika is verkry deur van 'n semi-gestruktureerde vraelys gebruik te maak. Die vraelys bestaan uit vyf afdelings genaamd "Algemeen, Versameling van Diere, Die Vrylating, Finansies en Wetlike Vereistes." Die studie het bevestig dat seevoël-rehabilitasiesentrums 'n kritiese rol in die bewaring van seevoëls speel. Daar is egter operasionele uitdagings om dié rol te kan vervul. Die studie het ook bevestig dat daar minimale ondersteuning van regeringskant is, en dat die wetgewing wat seevoël-rehabilitasiesentrums reguleer steeds nie die uitdagings, wat deur seevoël-rehabilitasiesentrums ondervind word, aanspreek nie. Hierdie studie erken ook dat daar pogings van die kant van die Departement van Omgewingsake is om die beleid en rasionalisering van sy wetgewing te hersien, sodat die fragmentasie van wetgewing wat die seevoël-rehabilitasiesentrums reguleer, geminimaliseer word. Met dié studie is tot die gevolgtrekking gekom dat 'n duidelike beleid-doelstelling en intervensie die sleutelkwessies sal aanspreek, wat seevoël-rehabilitasie se reformasie van hierdie sektor sal verseker. Die voorstelle van die studie stel dit dat ander beleidsmiddele, soos Norme en Standaarde, gebruik kan word om die nodige riglyne te verskaf. 'n Streng proses, wat beide die rehabiliteerders sowel as die regeringsamptenare betrek, is nodig om die vlak van bevoegdheid te verbeter. Die regering moet ook die behoefte

vir koördinerings met staatsentiteite en organisasies met die nodige vaardighede erken, sodat die beperking aan personeel-kapasiteit uitgeskakel kan word. Voorts word belyning van wetgewing om duplisering te minimaliseer, en die identifisering van ekonomiese instrumente, benodig om stukrag aan die seevoël-rehabilitasiesentrums te verleen. Laastens moet strategiese plekke in die land, en die drumpels van die seevoël-rehabilitasiesentrums, geïdentifiseer word om die uitbreiding van fasiliteite, wat reeds om bystand uit 'n beperkte finansiële bron meeding, te verhoed.

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Millicent Molesane Makoala

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ACRONYMS

ACAP	Agreement on the Conservation of Albatrosses and Petrels
AEWA	Agreement on the Convention of African-Eurasian Migratory Waterbirds
APBMP	African Penguin Biodiversity Management Plan
ASCLME	Agulhas Somali Current Large Marine Ecosystem
BBWW	Boat-Based Whale Watching
BCC	Benguela Current Convention
BCLME	Benguela Current Large Marine Ecosystem
BMP	Biodiversity Management Plan
BSL	Bird Scaring Lines
CBD	Convention on Biological Diversity
CCAMLR	Commission for the Conservation of Antarctic Marine Living Resources
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on the Conservation of Migratory Species of Wild Animals
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism
ECA	Environmental Conservation Act
EEZ	Exclusive Economic Zones
EMI	Environmental Management Inspectorate
EMS	Environmental Management Systems
GADG	Global Animal Data Group
GDP	Gross Domestic Product
IBM	International Business Machines
IEL	International Environmental Law
IEM	Integrated Environmental Management
IUCN	International Union for the Conservation of Nature
LME	Large Marine Ecosystem
LOSC	Law of the Sea Convention
MEA's	Multilateral Environmental Agreements
MLRA	Marine Living Resources Act

MOP	Meeting of Parties
MOU	Memorandum of Understanding
MPAs	Marine Protected Area
MSP	Marine Spatial Planning
NEMA	National Environmental Management Act
NEM:BA	National Environmental Management: Biodiversity Act
NEM:ICMA	National Environmental Management: Integrated Coastal Management Act
NEM:PAA	National Environmental Management: Protected Areas Act
NPO's	Non-Profit Organisations
N&S	Norms and Standards
PEI's	Prince Edward Islands
PIT	Passive Integrated Transponders
PMSSS	Policy on Seals, Seabirds and Shorebirds
RSA	Republic of South Africa
SANCCOB	South African Foundation for the Conservation of Coastal Birds
SANS	South African National Standards
SAVC	South African Veterinary Council
SBSPA	Sea Birds and Seals Protection Act
SEMA	Specific Environmental Management Act
SPSS	Statistical Package for the Social Sciences
TOPS	Threatened or Protected Species
TOPMS	Threatened or Protected Marine Species
UK	United Kingdom
UN	United Nations
UNEP	United Nations Environment Programmes
US	United States
WRC	Wildlife Rescue Centre
WSCD	White Shark Cage Diving

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CHAPTER 1: BACKGROUND TO THE STUDY

1.1. INTRODUCTION

South Africa is a maritime nation with one of the largest, resource-rich and relatively pristine Exclusive Economic Zones (EEZ) in the world (RSA, 2014b). With over 3,000 km of coastline, South Africa's coast is among the most varied in the world displaying high levels of both terrestrial and marine biodiversity (Wepener and Degger, 2012). Recorded marine biota in South Africa accounts for about 15% of global marine species diversity (Griffiths et al., 2010). The oceans surround South Africa on three sides, namely, East, South, and West, stretching from Namibia on the West coast to Mozambique on the East coast (RSA, 2014b). Furthermore, the coastline spans over two large marine ecosystems (LMEs), the Agulhas Somali Current Large Marine Ecosystem (ASCLME) as well as the Benguela Current Large Marine Ecosystem (BCLME) (RSA, 2014a).

The Agulhas Somali Current Large Marine Ecosystem (ASCLME) is comprised of two systems, the Somali Current and the Agulhas Current (Vousden, 2016). The Somali Current system extends from the horn of Africa in Somalia to the northern tip of Madagascar (Turpie and Wilson, 2011). The Agulhas Current system extends from the continental shelf of Mozambique to South Africa's Eastern Cape (Turpie and Wilson, 2011). The Benguela Current Large Marine Ecosystem is divided into two sub-systems, the northern and the southern (Adams et al. 1992; Shannon and Jarre-Teichmann, 1999). The northern Benguela extends from the South of Angola, while the southern Benguela extends from the Orange River mouth (between the border of South African and Namibia) to East London in the Eastern Cape and along the Agulhas Bank on the South coast (Cury and Shannon, 2004; Sowman and Cardoso, 2010). The southern Benguela sub-system is known for its upwelling along the southwestern coast of Africa and supports sizeable numbers of commercially exploited pelagic fish, as well as the seabirds that predate on them (Petersen et al. 2007).

Globally, the intensity and the range of exploitation within the marine environment increased rapidly in the 20th century (RSA, 2014b). These activities include deep

water fishing, tourism, oil and gas exploration, mineral extraction and energy transportation as well as marine transport. The economic development opportunities are ever increasing for maritime countries, and South Africa is no different. Recently, South Africa has launched its plans to increase its economic potential through the use of its marine resources. This was identified in 2014 when Operation Phakisa was launched in Durban to unlock the economic potential of the country's oceans. Five critical areas have already been identified. These are offshore oil and gas exploration; marine transport and manufacturing; tourism, aquaculture, as well as marine protection services and ocean governance (Van Wyk, 2015). To deal with this complex environment, South Africa requires a modern approach to deal efficiently with the increase in the use of marine resources and accumulation of anthropogenic impacts in the ocean space which affects biodiversity (RSA, 2014b). Marine Spatial Planning (MSP) is known to allocate space for marine-based industries and activities to fulfil the demand for marine goods and services while facilitating environmental conservation by imposing regulatory and management measures. MSP reduces cross-sector conflicts, enables proactive decision-making and safeguards the valuable ecosystem services (UNESCO-IOC, 2016). MSP enables recognition of all activities carried out in a maritime area and their linkages with the marine ecosystems, thereby allowing long-term sustainability of both human engagements and natural processes (Pomeroy and Douvere, 2008).

Over the decades, increasing anthropogenic activities in the marine environment have caused the decline of vertebrates, forest, mangroves, the condition of coral reefs (Butchart et al. 2010) and global seabird population (Montesdeoca, 2017). South Africa's seabird populations are no different (Barnes, 2000). Of the 15 seabird species breeding in southern Africa (Kemper et al. 2007), nine are listed in South Africa's Red Data Book as threatened in one of the three risk categories (Endangered, Vulnerable and Near-Threatened) (Kirkman, 2007). The anthropogenic activities that affect seabirds are mainly competition with commercial fisheries; pollution; by-catch mortality; alien invasive predators, habitat degradation and human disturbance (Crawford et al. 2000a; Croxall et al. 2012). Furthermore, the mismatch between the distribution of breeding sites and prey availability; diseases; predation; displacement from breeding sites; climate effects (David et al. 2003, Makhado et al.

2006) as well as immune pressures at colonies that were previously uninhabited by humans were identified as other factors (Crawford et al. 2000a).

The increase in maritime activities brought about the development of harbours to accommodate the merchant and fishing fleets (Vrancken, 2011). This led to South Africa's coastline becoming known as one of the busiest shipping routes in the world (Wepener and Degger, 2012). Furthermore, the increase in fuel transportation around South Africa's coastline has resulted in increased traffic of oil tankers (Underhill et al. 1999) resulting in oil spills. Indeed, South Africa is a global hotspot for oil pollution (Wolfaardt et al. 2009). The establishment of seabird rehabilitation centres coincided with the increase in transportation of fuel following the close of the Suez Canal in 1967, which increased oil spills around southern Africa at the time (Wolfaardt et al. 2009). One rehabilitation centre, the South African Foundation for the Conservation of Coastal Birds (SANCCOB) have reportedly rehabilitated well over 50 000 oiled seabirds between 1968 and 2005 (Wepener and Degger, 2012). The Apollo oil spill has seen more than 10 000 African penguins oiled (Underhill et al. 2009) and as recently as 2016, an oil spill resulting from the ship-to-ship bunkering operation in Algoa Bay resulted in approximately 100 African penguins oiled (Dr S. van der Spuy 2016, personal communication, 11 November).

Seabirds are also admitted to rehabilitation centres due to illness from diseases (Brossy et al. 1999), malnourishment due to food scarcity (Sherley et al. 2010), and seabird chicks due to abandonment (Sherley et al. 2014). Wildlife rehabilitation is defined as the treating and nursing of injured, ill or orphaned wild animals, with the purpose of releasing them back into the wild (Wimberger et al. 2010). The admission to wildlife in rehabilitation centres is as a result of the animals' proximity to humans. Wildlife rehabilitation was mainly the function of government but later became a low priority due to an increase in social liberation movements which forced conservation agencies to take over this responsibility without the necessary monetary support. The legislation regulating seabird rehabilitation lagged behind as well as the lack of monetary support from government placing conservation agencies with the predicament to maintain the quality of care for wildlife rehabilitation (Wimberger et al. 2010).

Recently, the number of seabird rehabilitation centres in South Africa has risen, due to the increase in admission of seabirds due to anthropogenic impacts (Trathan et al. 2015). The admission of more seabirds means that the operational costs of resources such as staff, equipment and veterinary care are on the rise; resulting in competition for funding from donors and putting the quality of care for these declining species at risk (Fraser and Moss, 1985; Karesh, 1995). Rehabilitation centres can play a crucial role in the conservation of species (Miller et al. 2004). This role can also provide the necessary knowledge generated through research into reproductive biology as well as to provide education and awareness material for the general public about the threat status of seabird species (van Dijk, 2005; Soorae, 2005).

In addition to operational challenges, the legislation on seabird rehabilitation has been lagging (Adv. N. de Kock 2016, personal communication, 4 June). The National Environmental Management: Biodiversity Act (10 of 2004) (NEM:BA) (RSA, 2004) is the most relevant in providing “protection for species in need of protection”. Since the enactment of NEM:BA in 2004, numerous shortcomings in the legislation have emerged (Adv. N. de Kock 2016, personal communication, 4 June). One of these shortcomings is the management and regulation of marine species, noticed particularly in top predators such as sea turtles, sharks, cetaceans, seals, and seabirds (Adv. N. de Kock 2016, personal communication, 4 June). The decline of seabirds has in recent years brought the spotlight on the shortcomings of the environmental legislation to the fore, where the legislation addressing seabirds has been perceived to be inconsistent, fragmented and somewhat outdated (RSA, 2013b). Furthermore, the NEM:BA does not outline the standard of quality of care for seabird rehabilitation, and requires minimal demonstration of competence by seabird rehabilitation centres (Adv. N. de Kock 2016, personal communication, 4 June). Therefore, rehabilitation may fail to provide diagnostic techniques required for treatment and better clinical recovery for seabirds (Molina-López et al. 2015).

1.2. PROBLEM STATEMENT

Declining seabird populations from anthropogenic impacts make it important to admit seabirds that require rehabilitation. With the growing number of anthropogenic activities, it raises a point whether the quality of care within seabird rehabilitation

centres is adequate to contribute to seabird conservation, also, whether there is an adequate legal framework to regulate them.

1.3. RATIONALE OF THE STUDY

For decades, increasing anthropogenic activities in the marine environment have resulted in the global decline of seabirds. Decreasing seabird habitats have led to the displacement of the species as well as affecting their well-being. Seabird rehabilitation centres have increased in South Africa over the decades. They assist distressed, injured or orphaned seabirds by taking them out of their natural environment to give care to or humanely euthanise them in captivity. Seabird rehabilitation centres have occupied a niche responsibility that was previously not available in South African society and have also demonstrated their capabilities in the conservation of seabirds with little or no support from the government.

1.4. RESEARCH QUESTIONS

There is not a total absence of regulation of seabird rehabilitation centres. Therefore, what effect does this have on the quality of care for seabirds undergoing rehabilitation?

1.5. HYPOTHESIS

There is minimal legislation regulating seabird rehabilitation centres in South Africa. Therefore, this may inadvertently result in the lack of quality of care in these facilities.

1.6. OBJECTIVES OF THE STUDY

The objectives of the study are to:

- Examine legislative challenges in the management of seabird rehabilitation in South Africa;
- Assess the implementation of the necessary legislation i.e. Biodiversity Act, with specific applications to seabirds and seabird rehabilitation centres;
- Evaluate the impediments in rehabilitation centres and captive institutions which may affect the quality of care for seabird species;

- Make recommendations to management authorities regarding an improved legislative framework that can improve the standard of seabird rehabilitation centres and captive institutions, in order to benefit seabird populations by using the available scientific knowledge.

1.7. AIMS OF THE STUDY

This study seeks to investigate how environmental legislation can help improve the management of seabirds in rehabilitation centres, in order to aid seabird conservation efforts. The study also aims to review the understanding of the legislative framework on seabird rehabilitation in South Africa and its importance to conservation. Finally, the study will examine policy options for improving the state of rehabilitation centres to promote seabird conservation in South Africa, in order to achieve environmental goals.

CHAPTER 2: LITERATURE REVIEW

2.1 SOUTH AFRICA'S OCEAN ENVIRONMENT

South Africa prides itself with a coastline of 3 924 km, which is inclusive of the Prince Edward Islands (PEIs), South Africa's sovereign small offshore islands in the Southern Ocean (RSA, 2014b; RSA, undated). The extent of the country's Exclusive Economic Zone (EEZ) is estimated at 1 553 000 km² including an additional extended EEZ of a further 1 108 000 km² around the Prince Edward Islands exceeding its terrestrial jurisdiction (RSA, 2014b). The Maritime Zones Act (15 of 1994) (RSA, 1994) defines the EEZ of South Africa as "the sea beyond territorial waters referred to in section 4, but within a distance of two hundred nautical miles from the baselines" whereas the Territorial waters is defined as "the sea within a distance of twelve nautical miles from the baselines".

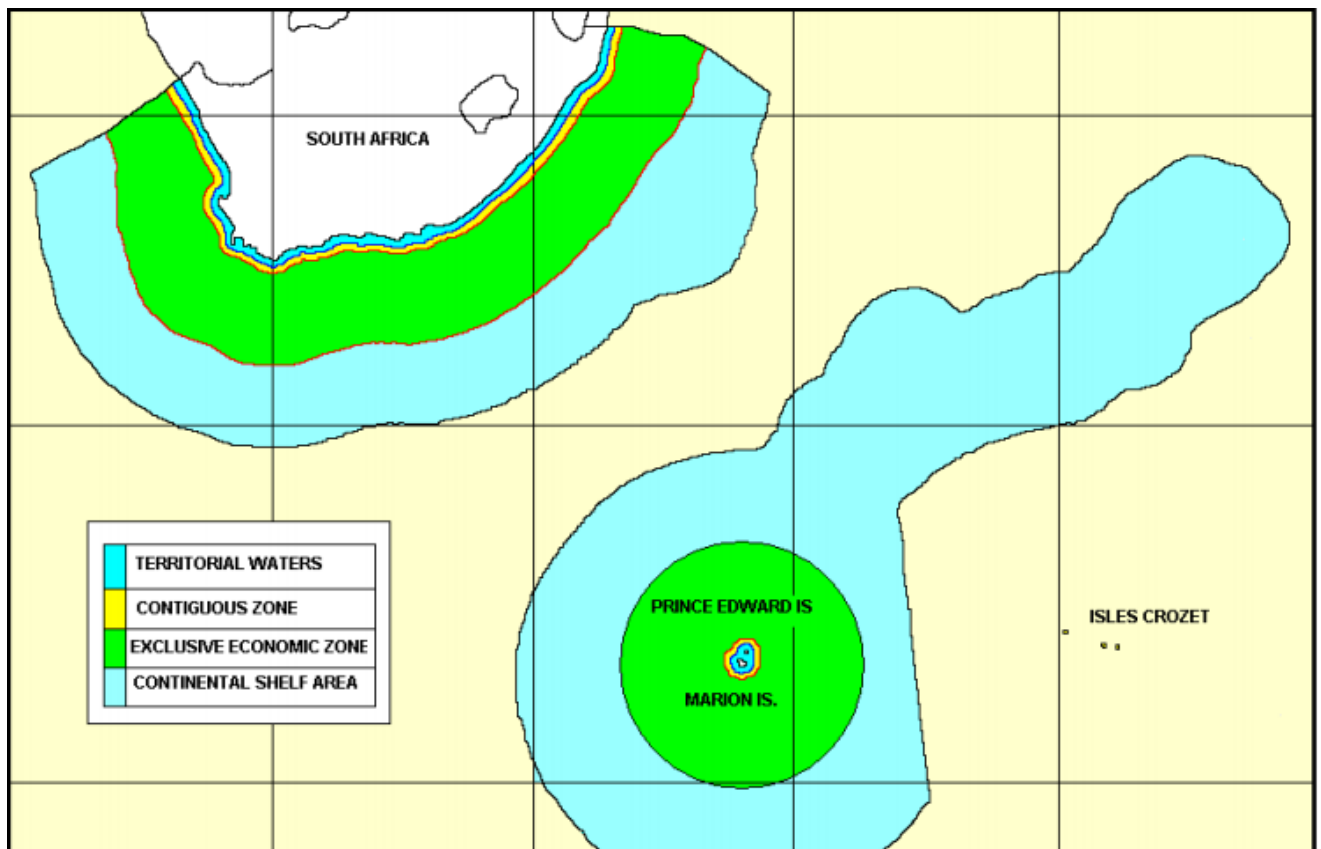


Figure 1: Maritime Zones of South Africa (RSA, undated)

South Africa possesses high biological diversity (Wepener & Degger, 2012; RSA, 2014b) ranging from desert to subtropical forests, as well as its marine and coastal ecosystems (Wynberg, 2002). At least 12 914 species of marine biota have been recorded in South Africa (Griffiths et al. 2010). It is considered as one of the 17 megadiverse countries in the world (Crouch et al. 2008). Despite the richness in marine biota, approximately 23% of South Africa's coastline is under formal protection, with little to no protection in the deep sea (Griffiths et al. 2010), with an additional 5% of marine area proposed for protection (Sink, 2016). For centuries, the association of South Africans with the coastline has increased (Sharfman et al. 2012). From the late fifteenth century, maritime infrastructure such as harbours, lighthouses, shipyards, seawalls, marinas, railway lines, pipelines and other associated infrastructure have emerged (Griffiths et al. 2010; Sharfman et al. 2012). The ports, cities and holiday resorts began to spread to adjacent fertile farms; (O'Donoghue and Marshall, 2003) providing residential opportunities for over a third (about 30%) of South Africa's population who reside within 60km of the coastline (Wepener and Degger, 2012).

Currently, the coastline is a source of provision for food, transportation essential for trade and migration; development and recreation (Sharfman et al. 2012). The nature of South Africa's coastline makes it a viable contributor to the country's economic development (O'Donoghue and Marshall, 2003), with its geographical position essential for maritime trade between the East and Europe (Sharfman et al. 2012). The maritime sector has been regarded as the lifeline of southern African countries to acquire earnings on export as well as commodities and minerals for their economic survival (Iheduru, 1996).

Over the years, the necessary infrastructure required for development, has increased, and places pressure on marine ecological systems (Attwood et al. 1997a). This adds to their degradation through the threats exerted on them (O'Donoghue and Marshall, 2003; Butchart et al. 2004; 2010). The anthropogenic activities have increased in variety and intensity in the last century (Griffiths et al. 2010) and are mainly due to the reliance on resources, products, transportation and economic gains (David et al. 2003; Wepener & Degger, 2012). The deterioration of the ocean health and the exploitation of its assets are as a result of both direct and

indirect exploitation, as well as unsustainable levels of pollution and bycatch (Nel and Froneman, 2015). Furthermore, the global increase in food, water, land and energy demands has resulted in the loss of habitat through destruction, degradation, and fragmentation, and these threats to biodiversity are still increasing (Baur, 2011). These are indicated by population declines of vertebrates, forest, mangroves, the condition of coral reefs and seabird populations (Butchart et al. 2010) and may be applicable to South Africa.

The maritime and marine sector in the country has been estimated to contribute about 35% of the gross domestic product (GDP) (O'Donoghue and Marshall, 2003). This is predicted to increase to R177 billion of the GDP and contribute to over one million jobs by 2033 from R54 billion in 2010 and has accounted for 316 000 jobs (Van Wyk, 2015). The South African government has identified the maritime and marine sector as a priority and launched the Operation Phakisa in 2014, based on the Malaysian Big Fast Result programme. Operation Phakisa, which means to “hurry up” in Sesotho, aims to harness the socio-economic benefits of South Africa's ocean space (Van Wyk, 2015).

2.2 SEABIRDS IN SOUTH AFRICA

Seabirds are the most threatened compared to other bird groups with faster population declines over the past decades (Maree et al. 2014). Of the 346 species of seabirds, almost half (47%) (Croxall et al. 2012) are facing severe threats of extinction (Hutchins, 2003) predominantly from anthropogenic impacts (Butchart et al. 2004; Baur, 2011; Miteva et al. 2012). About 69% of the global seabird population has declined between 1950 and 2010 (Montesdeoca et al. 2017). Most of these are pelagic species, having declined 52% in comparison to their coastal counterparts that are at 33% population decline (Croxall et al. 2012). The anthropogenic impacts on seabirds have been ongoing for over 250 years. The ability of seabirds to travel great distances for foraging exposes them to a myriad of risks (Maree et al. 2014). The rapid rate of their decline brings uncertainty of recovery once populations have reached low numbers, despite some penguins having displayed resilience, with adequate protection (Trathan et al. 2015).

Most of the global seabird populations are threatened by commercial fisheries and by-catch due to the lack of spatial management to fisheries (Karpouzi et al. 2007; Crawford and Jahncke, 1999), pollution (Trathan et al. 2015); energy production and mining (Croxall et al. 2012). On land, they are threatened by habitat degradation introduction of invasive predators and human disturbance (Croxall et al. 2012; Jones et al. 2008); pathogens due to increase in human presence at colonies (Grémillet and Boulinier, 2009) and environmental variability, as well as climate change (Trathan et al. 2015).

Seabirds are larger than most other 'land-based' bird groups (Schreiber and Burger, 2002) and have a small total breeding area (Croxall et al. 2012). They are also long-lived and have low reproductive rates due to delayed maturity (Petersen et al. 2007). Seabirds make use of vast marine, intertidal and terrestrial environments (Jones et al. 2008). They forage over a large geographic area (Mallory et al. 2010) and at higher trophic levels as apex predators and can integrate ecological processes across high and low trophic levels (Einoder, 2009; Mallory et al. 2010; Grémillet and Charmantier, 2010). Their life-history, biology and ecology are primarily based on the productivity of the marine environment, therefore, making them suitable indicators of a functioning marine ecosystem (Croxall et al. 2012; Trathan et al. 2015; Jones et al. 2008; Mallory et al. 2009). For example, environmental stress can be picked up from seabirds through lack of reproductive effort, breeding success and survival (Mallory et al. 2010).

Seabirds are excellent candidates of ecological indicators in the marine environment as subtle changes in the ecosystem can affect their physiology, providing early warning indicators of ecosystem change (Grémillet and Charmantier, 2010; Mallory et al. 2010; Trathan et al. 2015). They breed on land where monitoring is more efficient as they are easily caught (Grémillet and Charmantier, 2010) to provide valuable information on vast and remote aquatic ecosystems where there is little to no monitoring (Einoder, 2009; Mallory et al. 2010). They can be used to monitor change in oceanographic production, pollution, the sizes of fish stocks and the effectiveness of fisheries management practices, as well as ecological responses to changes in the productivity of aquatic ecosystems and climate change (Trathan et al. 2015). It is advocated that sentinel species be used as ecological indicators to

promote sustainable fisheries and ecosystem-based management (Isaacs, 2006; Grémillet and Charmantier, 2010).

2.2.1 Population Trends and Status of Seabirds off the coast of South Africa

There are 15 breeding seabird species in southern Africa with an additional 62 other seabird species that visit the region as migrants, contributing to the seabird assemblage (Crawford et al. 2017). Seabirds in South Africa breed in approximately 18 breeding localities including islands such as Malgas, Jutten, Dassen and Dyer among others, which are rocky and support large numbers of breeding seabirds (Bosman and Hockey, 1988).

The productivity of the Benguela ecosystem, as well as the variations found in the Indian, Atlantic and Southern oceans, provides a haven for seabirds (Cooper et al. 1984; Rollinson et al. 2016). Of the 15 species that breed on South Africa's mainland, nine (60 percent) are endemic to the region (Crawford, 2007). This high degree of endemism results from southern Africa's coastal islands separated by vast distances from other seabird breeding localities to the north, in the Atlantic and Indian Oceans, or south in the Southern Ocean (Cooper et al. 1984). It also means that the region has the primary responsibility for the conservation of seabirds. The endemic species include the African Penguin (*Spheniscus demersus*), Cape Gannet (*Morus capensis*) and three species of cormorants (*Phalacrocorax spp.*), two gull species (*Larus spp.*) as well as two species of terns (*Sterna spp.*) (Kirkman, 2007). The kelp gull (*Larus dominicanus*) and the Swift Tern (*Sterna bergii bergii*) are regarded as endemic subspecies (Crawford, 2013). Of the seven endemic species, four are classified as Threatened and one as Near- Threatened.

The six non-endemic seabird species include the Roseate Tern (*S. dougallii*) and Leach's Storm-petrel (*Oceanodroma leucorhoa*) White-breasted Cormorant (*P. lucidus*), Great White Pelican (*Pelecanus onocrotalus*), Grey-headed Gull (*L. cirrocephalus*) and Caspian Tern (*S. caspia*) (Kirkman, 2007). The Roseate Tern and the Leach's Storm-petrel have been recorded as occurring in small isolated populations in the Benguela Current Large Marine Ecosystem (BCLME), while the other four species are known to breed in both freshwater as well as marine environments and extend further into the sub-Saharan region (Kirkman, 2007).

Nine of the fifteen species of seabirds that breed in the BCLME are listed in South Africa's Red Data Book as threatened in one of three risk categories, namely Endangered, Vulnerable and Near-threatened (Barnes, 2000). As of 2017, the global conservation status for some of these seabird species was assessed under the International Union for the Conservation of Nature (IUCN) categories and are as follows:

Table 1: Conservation status of some of the seabirds as assessed under the IUCN categories

Conservation status	Seabird species
Endangered	Bank cormorant
	Cape gannet
	African penguin
	Cape cormorant
Vulnerable	Damara tern
Near-threatened	Crowned cormorant

The Leach's Storm-petrel (*Oceanodroma leucorhoa*) was first discovered to breed in the southern hemisphere as recently as 1996 (Best et al. 1997) and approximately five pairs are being recorded every year in Dassen Island, whilst the Dyer island population seems to have gone extinct, with no record in the past five years (DEA, unpublished data).

The four threatened seabirds, the African Penguin, Cape Gannet and Cape Cormorant compete with South Africa's fisheries for sardines and anchovies while the Bank Cormorants compete for lobster (Crawford et al. 2008). Populations of these seabirds have recently shown significant decreases, mainly off South Africa's West Coast. By contrast, the South African population of Crowned Cormorant, which does not compete with fisheries for food, has remained stable (Crawford et al. 2008; 2016).

2.2.2 Challenges surrounding seabirds in South Africa

The 20th century saw a decline in the seabird species endemic to the Benguela ecosystem. These include Cape Cormorant (*Phalacrocorax capensis*) Cape Gannet (*Morus capensis*) and African Penguin (*Spheniscus demersus*) (Crawford, 1999). The decline of these species was mainly attributed to (i) direct harvesting of seabirds and their eggs, (ii) destruction of their breeding habitat via guano scraping, (iii) oil pollution and (iv) overexploitation of pelagic fish by industrial fisheries (Hockey, Dean & Ryan 2005). This is because seabirds are larger in size and are highly visible to humans, making them easier targets to be killed for food and oil (Randall, 1989; Cott, 1953; Trathan et al. 2015), for their feathers for down (Randall, 1989; Cott, 1953); as bait for crabs (Trathan et al. 2015) as well as their guano for fertilizer (Hutchinson, 1950). Other factors contributing to the decline of seabirds include competition for fishing resources, fishery by-catch, diseases, toxic algal poisoning as well as environmental variability and climate change (Trathan et al. 2015). The following are some of the key factors contributing to the decline of seabirds:

2.2.2.1 Degradation of breeding habitat and disturbance by people

The degradation of breeding habitat is one of the major threats affecting most seabirds (Sherley et al. 2012; Trathan et al. 2015). This was followed by the harvesting of historical deposits of guano in the late 19th century and early 20th century (Crawford and Jahncke, 1999; Sherley et al. 2012). The guano deposits off the southern African coast were collected for fertiliser (Bosman and Hocky, 1988) at the end of each breeding season (Crawford and Jahncke, 1999) with the last collection of guano from Malgas Island in 1986 (Bosman and Hocky, 1988). Guano was used by the African penguin to build nests to shelter them from various environmental elements such as heat, floods and aerial predation (RSA, 2013b). Modification of islands by human activities such as the removal of large deposits of guano at penguin colonies to be used as fertilisers also rendered seabirds more susceptible to displacement (RSA, 2013b). Thus the guano collection resulted in penguins to breed in suboptimal conditions (Sherley et al. 2012). Guano provides dissolved nutrients essential in the increase of primary production which accelerate the rapid growth of algae and several species of intertidal herbivores. The rapid growth of intertidal herbivores, in turn, support dense populations of the African

Black Oystercatcher (*Haemotopus moquini*), which feeds on limpets (Bosman and Hockey, 1988).

The disturbance by humans around seabird breeding areas and other areas essential for aggregation has been spatially limiting to some seabirds (Griffiths et al. 2010). Some disturbances are temporal, especially around recreational areas during holiday periods (Trathan et al. 2015). The end of the 20th century has seen an increase in ecotourism in southern Africa. Species such as whales, dolphins, sharks and seabirds have over the years become the focus and a profitable resource for the ecotourism industry (Best et al. 1997). The increase in ecotourism and outdoor recreation has caused major disruption to wildlife, and this increase is most likely to double by 2020 (Bennett et al. 2008). It must also be noted that most seabird colonies are tourist areas and are generally in well-controlled areas, with clearly defined paths and boardwalks, though there are some illegal activities (Trathan et al. 2015).

Increased recreational activities have been considered a potential threat to biodiversity (Gill, 2007). Humans alter the way in which animals can access essential resources through direct restriction of valuable resources such as food, nesting, or roosting sites as well by changing sites or the way they appear; making it confusing for wildlife (Gill, 2007). The effects of disturbance may affect the change in distribution, behaviour, demography and population sizes in various ways:

- a) Change in distribution and behaviour where wildlife avoids areas with high levels of human disturbance especially over a long term, while short-term effects affect the movement of wildlife in response to human presence (Gill, 2007). This may alter flight response and incubation patterns.
- b) Reduced fecundity and survival in disturbed areas (Gill, 2007). African penguins are known to exhibit high spatial and temporal variation in breeding success, primarily driven by the availability of food and “factors have been identified that influence productivity, including nesting type and quality” (Sherley et al. 2012).
- c) Change in population size affects demographic changes, leading to density reduction. The decline in the population size of the African Penguin indicates the extent that disturbance can have on a population. Over 80% of the African

penguin population has decreased since the 1920s, with more than 50% of the reduction recorded from 1956 to 1978 by Crawford and Shelton (1981) (cited by Shelton et al. 1984).

Revenue, environmental awareness and wildlife preservation have increased due to eco-tourism and outdoor recreation activities, but some benefits have been notable by the conservation industry in that members of the public have grown in their appreciation for wildlife and support (Beale, 2007; Bennett et al. 2008). Access to areas of biodiversity provides an opportunity to influence the public's perception on matters of conservation (Beale, 2007; Bennett et al. 2008).

2.2.2.2 Marine Pollution

Although South Africa's marine environment has been described as pristine this claim has not been fully substantiated due to the lack of comprehensive data on pollutants (RSA, 2014b; O'Donoghue and Marshall, 2003) owing to the absence of marine pollution research in the country (Wepener & Degger, 2012).

The influx of human inhabitants along with the necessary infrastructure development required, places pressure on coastal ecological systems, adding to their degradation through the threats exerted on them, including pollution of the coastal and marine environment (O'Donoghue and Marshall, 2003). The transformation of coastal systems by anthropogenic activities is mainly due to the reliance on resources, products, transportation and economic gains; increasing waste and pollution (Wepener and Degger, 2012). These developments, both near-shore and offshore, have resulted in increasing volumes of fish waste, sewage, industrial effluent and other sources of land-based pollution into the marine environment (Griffiths et al. 2010).

Recently, marine debris (persistent manufactured material) has become another potential threat to seabirds (Ryan, 1989). Seabirds become entangled in plastic or ingest small plastic items, although in relatively small proportions (Derraik, 2002). Conventions such as the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), of which South Africa is a signatory, has placed international restrictions to minimise dumping of waste at sea for the conservation of marine living

resources (Trathan et al. 2015). The Commission has further urged contracting parties to enshrine this in local legislation.

The effects of coastal and inshore mining along the southern African coastline of South Africa and Namibia threaten foraging habitats of seabird through the large-scale release of sediments, therefore, increasing turbidity and deterring prey. In turn, seabirds are less likely to find prey, which causes a change in foraging behaviour (Trathan et al. 2015). Sedimentation can lead to the formation of land bridges, allowing for land-based predators to access colonies to which they previously did not have access (Kemper, 2006). Other pollution impacts include organochlorine and the accumulation of heavy metals such as mercury, which can bio-accumulate in prey as well as contaminate the marine environment. Seabird tissues can also be used to assess bioaccumulation of pollutants (Rochman et al. 2014; Fort et al. 2014; Tanaka et al. 2015; Bouwman et al. 2015).

The position of South Africa's coastline has also contributed to the rich marine diversity but also to its disadvantage regarding pollution-related incidences, particularly from ships. South Africa's coastline is one of the busiest shipping routes in the world, with 95% of its trade volume being seaborne (Wepener and Degger, 2012; Chasomeris, 2006). Over 28% of oil exports pass along this coastline from the Middle East (Wepener & Degger, 2012). The increase in ship traffic along the South African coastline has resulted in a high frequency of oil spills that have affected the density of seabird populations in and around the breeding habitats (Best et al. 1997; Trathan et al. 2015). Marine pollution can have devastating effects on local seabird populations. Polluted seabirds have been recorded from as far as the Southern Ocean. These birds are most likely to have been affected by the illegal wash-out of oil from vessels, and many die undetected. This has been observed mainly during the winter months (Trathan et al. 2015).

South Africa is a global hotspot for oil pollution (Wepener & Degger, 2012). This status peaked in the latter half of the 20th century, due to increased transportation of fuel following the close of the Suez Canal in 1967 (Wolfaardt et al. 2009). Not only did this increase the traffic of tankers around the Cape of Good Hope, but also their size (Wolfaardt et al. 2009), therefore increasing the likelihood of oil spills (Wepener

& Degger, 2012). Despite global efforts to have ships sail at a distance from breeding colonies, South Africa's colonies are still susceptible to oil pollution from ships (Trathan et al. 2015).

The impact of oil pollution on seabirds has increased over the years leading to extensive studies being conducted to assess the effects of oil pollution on seabirds (Wolfaardt et al. 2009). Since the South African Foundation for the Conservation of Coastal Birds (SANCCOB) was established in 1968 (Underhill et al. 1999; Kane et al. 2010) until 2005, over 50 000 have been cleaned, rehabilitated, and returned to the natural population (Wepener & Degger, 2012). However, of these birds, ca. 27% were unable to breed after release (Barham et al. 2007), reverting the focus to strategies and management approaches for better preventing and reducing the occurrence of oil spills (Wolfaardt et al. 2009).

About 17 000 penguins were de-oiled and released back into the wild after the Treasure oil spill in 2000. When adults are oiled and removed or die, their chicks are abandoned. Approximately 3 000 orphaned chicks were hand-reared and released back to Robben and Dassen islands following the Treasure oil spill. The results revealed that their survival to breeding age was no different from that of naturally reared chicks (Crawford et al. 2000b; Barham et al. 2008). Penguins, particularly, have been the most affected seabirds from oil pollution due to their non-volant nature. They are most vulnerable to oil pollution because of their extreme need to maintain their plumage in good condition (Trathan et al. 2015).

2.2.2.3 Fisheries

Commercial fisheries have caused a considerable decline of seabirds over the last few decades (Brothers et al. 1999; Gilman, 2001; Petersen et al. 2007; Watkins et al. 2008; Einoder, 2009; Crawford et al. 2011; Trathan et al. 2015). The decline in world fish stocks (Einoder, 2009) coincide with the global decline of seabirds (Trathan et al. 2015) as seabirds are regarded as competitors for forage fish (Best et al. 1997, Crawford et al. 2011). This has caused conflicts between the conservation management as well as the fisheries management sectors (Hildén, 1997). The conflict has resulted in the development of multispecies models within the fishing industry to assess species interactions (Einoder, 2009). The investigation of

competition for fish between humans and penguins commenced in the 1950s and may lead researchers to use seabirds as indicators of fishery management (Best et al. 1997).

Seabirds and other animals preying on fish were seen as pests (Bomford and Sinclair, 2002). Competition with fisheries for prey led to a reduction in the breeding success of seabirds (Crawford and Dyer, 1995). There is a strong correlation between the decline of seabirds and the availability of prey species (Best et al. 1997) due to competition for food between fisheries and seabirds (Trathan et al. 2015). African penguin populations have declined primarily due to incidental mortality and resource competition due to the impacts of the fishing industry and environmental variability. It has also been successfully shown that prey reduction of sardines has a direct link to penguin numbers (Trathan et al. 2015). Also, in 1990, the decrease in the abundance of Cape Anchovy led to the scarcity of food for Cape Cormorants in 1991 (Crawford and Jahncke, 1999) and they were less likely to breed in areas of low abundance in anchovy (Crawford et al. 1999).

Additionally, recent studies have revealed that there is an eastward migration of anchovy and sardine stocks in South Africa causing a mismatch in the distribution of breeding habitat and prey abundance (Barange et al. 1999; Sherley et al. 2014;). The colonies along the west coast of South Africa have been heavily impacted by the collapse of pelagic fish stocks alongside the intensified fishing (Trathan et al. 2015; Crawford et al. 2006). This is a loss of approximately 70% of the west coast population. The survival rate of seabirds such as penguins has also been compromised, due to the prey availability in the area (Trathan et al. 2015).

In trawl fishing operations, seabirds collide with trawl cables and net sonde cables, resulting in injuries and drowning (Watkins et al. 2008; Maree et al. 2014; Trathan et al. 2015). Longline fishing was identified as the main threat to seabirds, but over the years, substantial evidence indicates that demersal fishing is also a threat (Maree et al. 2014; Watkins et al. 2008). The mandatory deployment of Bird-scaring lines (BSL's) has resulted in the reduction of collisions with seabirds (Maree et al. 2014) also new technologies in the form of exclusion devices have been developed to minimise the severity of threats on seabirds though these are not always successful

(Trathan et al. 2015). Bird-scaring lines are a cheaper option than having vessels retrofitted with expensive devices.

Long-term monitoring of prey stocks and stock assessments are required to evaluate the impacts of competition on the various species of seabirds (Trathan et al. 2015). The uncertainty of information regarding the prey stock size may impact management decisions (Hildén, 1997). Spatial or temporal means in fisheries management are required to separate fishing activities from seabirds (Trathan et al. 2015) to allow adequate prey for seabirds through forms of prohibition of specified types of fishing near breeding localities and to allow for sufficient escapement of prey (Crawford et al. 2008b; Crawford, 2007). The management of an ecosystem-based approach to fisheries management requires precautionary principles, where there is a threshold on the tonnage of prey species. This would allow for stock recovery and sufficient forage for predators as well as maintain the function, structure and composition of marine ecosystems (Einoder, 2009; Trathan et al. 2015). Other management options include complete closure of fishing around seabird colonies which may affect the fisheries sector economically (Hildén, 1997). This would limit localised fishing competition between seabirds and fishing vessels. It is to be noted that the effects of fishing closures around seabird colonies may not be seen immediately (Hildén, 1997).

2.2.2.4 Diseases

Mortalities of seabirds have been recorded in much literature in recent times (Randall and Bray, 1983; Brossy, 1992; Brossy et al. 1999; Williams and Ward 2002; Parsons and Underhill, 2005), although the knowledge about seabird diseases in the wild is limited (Trathan et al. 2015). More than ever, the frequency of people at seabird colonies has over the years increased, therefore increasing the potential for the introduction of pathogens previously not occurring in those colonies. Climate change has been identified as a driver that may exacerbate the disease-carrying vectors (Trathan et al. 2015). Disease outbreaks in susceptible colonies could lead to high mortalities of seabirds placing further strain in the conservation of seabirds (Brossy et al. 1999). Diseased carcasses must be removed from colonies and incinerated, to minimise the further infections (Friend, 1999; Waller and Underhill, 2007).

Avian cholera (*Pasteurella multocida*) and avian malaria (*Plasmodium spp*) have been recorded in colonies of Lambert's Bay, Dassen Island, Dyer Island and Robben Island (Williams and Ward 2002; Brossy et al. 1999; Waller and Underhill, 2007) including in wild birds from Boulders near Simon's Town; Marcus and Malgas island on the west coast as well as St Croix and Bird islands in the Eastern Cape (Brossy et al. 1999). The first outbreak of avian cholera in South Africa was recorded in the 1940s at Malgas Island, where Cape Gannets were the most affected seabirds. The frequency of avian cholera outbreaks globally has increased over the years, making it the most infectious wildlife disease of water birds in the United States. Avian cholera is a contagious disease and seabirds succumb to the disease a few days following the outbreak (Waller and Underhill, 2007).

Avian cholera is predominantly spread through carcasses as well as the secretion from the mouth and nose in water pools (Crawford et al. 1999). About 9 500 adult Cape cormorants and 4 500 chicks were killed in an avian cholera outbreak at Dyer Island between 2004 and 2005 (Waller and Underhill, 2007). This occurred after a survey was conducted in 1991 at eight islands off the west coast during October and November, where 14 500 adult Cape cormorants were found dead at Bird Island, Lambert's Bay; Malgas, Meeuw, Schaapen, Vondeling, Dassen and Dyer Islands. Dassen Island recorded the highest number of dead Cape Cormorant's mortality at 10 000; amounting to about 16% of the breeding population (Crawford et al. 1992; Waller and Underhill, 2007). The mortality of other species of seabirds in full plumage was recorded at these islands. These were Cape Gannet, Kelp Gull, African Black Oystercatcher (*Haemotopus moquini*), and the African Penguin, Bank Cormorant, White Breasted Cormorant and White Pelican (*Pelecanus onocrotalus*) (Crawford et al. 1992; Waller and Underhill, 2007).

Dyer Island has been recorded as having the most mortalities due to avian cholera outbreaks in South Africa, with the most affected birds being the Cape cormorants (Waller and Underhill, 2007). Avian malaria has been recorded in the wild as well as in captive African penguins (Brossy 1992; 1999; Grim et al. 2003, Parsons and Underhill, 2005). It has also been found in other flying birds common in the Western Cape, such as House Sparrow (*Passer domesticus*); Red Bishop Bird (*Euplectes*

orix) and the Karoo Prinia (*Prinia maculosa*) where cross-infection between these species and African Penguin is most likely. There is currently no vaccine for *Plasmodium* (Brossy et al. 1999).

Other diseases that can be spread by African penguins and other seabirds when birds are released into the wild after rehabilitation include *aspergillosis*, *leucocytozoonosis* (Brossy et al. 1999) and trematode worms (*Cardiocephaloides physalis*). Trematode worms largely affected the island of St Croix in late June 1981. Chicks between the ages of 60 to 80 days were mainly affected, contributing the high chick mortality at the island. Clinical symptoms exhibited by the chicks were general weaknesses such glazed expressions and half-closed eyes (Randall and Bray, 1983).

African penguins have over the years shown a rare disorder that is most uncommon to bird species and is rarely reported in the wild. This rare and uncommon disorder is known as the feather-loss disorder and exposes the bare skin of the penguin. This loss of feathers in *Spheniscus* species in South Africa was first recorded in 1989 and was believed to be associated with malnutrition, although later these claims were refuted. This was also noticed by a seabird rehabilitation centre in Cape Town in 2006, mainly in chicks and it remained undetected in the wild until two years later. The colonies where feather-loss was observed in chicks were Dassen, Dyer and Robben islands (Woods, 2016; Kane et al. 2010).

Four colonies in Punta Tombo, Argentina, started noticing similar trends in Magellanic penguins a year after being noticed in a South African rehabilitation centre (Woods, 2016). It has been most notable in only two penguin species, the Magellanic Penguin (*S. magellanicus*) and the African Penguin (*S. demersus*). Penguins have down or feathers covering most of their body except the bill and feet (Kane et al. 2010). Previous studies primarily based on the rehabilitation of these two species have led to the development of the baseline for normal penguin feathering. The admission of African penguin chicks by SANCCOB in Cape Town, recorded 7%, 18% and 11% of feather-loss in chicks admitted in 2006, 2007 and 2008 respectively (Kane et al. 2010). The feather-losses, mainly bald patches, appeared about 18 days after admission, while new feather growth was recorded 34 days after admission.

The rehabilitation centre noticed that mortality while under rehabilitation was similar for both feathered and featherless African penguin chicks. It is suggested that the feather-loss disorder in African penguins is most probably associated with close contact and enclosed spaces (Kane et al. 2010). The challenge with the loss of feathers in penguin chicks is that their insulation is poor, therefore losing body heat very quickly. The chicks end up using more energy to maintain their body temperature. The release of captive seabirds, especially when they may have been diagnosed with the disease, requires attention to ensure that released seabirds are not going spread diseases to their new natural environment (Brossy et al. 1999).

Seabirds are not only prone to diseases in the wild, but there are also disease outbreaks in the captive environment which can pose a severe threat to wild populations if undetected (Kane et al. 2010; Brossy et al. 1999). For example, the SANCCOB rehabilitation centre has tested positive to *Plasmodium* in seabirds obtained from wild colonies (Brossy et al. 1999). This parasite in captive penguins was most apparent between October and May with prominent peaks in December. The peak in *Plasmodium* coincided with low admission penguin periods but may pose a significant risk to birds already undergoing rehabilitation. Another disease-causing organism, found mainly in African Penguins is *Babesia peircei*, an avian *piroplasmid* and parasite. In a publication by Earlé et al. (1993), it was found to be a new species (Brossy et al. 1999).

2.2.2.5 Environmental variability and Climate Change

Human activities have led to increased changes which result in sea level rise, as well as changes in the circulatory and sea surface temperature patterns (Griffiths et al. 2010). Though sea level rise is not predicted to have major impacts on most coastal species, it may, however, cause loss of habitat, cause a change in the geographical range of species as well as changes in community composition, due to climate-induced change (Griffiths et al. 2010).

Further studies need to be conducted on the impacts of global climate change on seabirds in the Benguela upwelling system to understand better how climate and environmental variability can affect seabirds (Crawford et al. 2008b). Penguins are known to be the first respondents to changing environmental conditions, by

modifying their breeding success and altering their distribution and abundance. Long-term monitoring of impacts of climate change on seabirds is recommended (Trathan et al. 2015).

2.3 SEABIRD REHABILITATION IN SOUTH AFRICA

2.3.1 Background

Wildlife rehabilitation is the treatment of injured, ill or orphaned wild animals (Fraser and Moss, 1985; Wimberger et al. 2010), under temporary care with the goal of releasing them back into their natural habitat (Brossy et al. 1999). It is a complex process that requires veterinary care to ensure physical recovery for the reconditioning of the injured animal for release (Molina-López et al. 2013). Over the years, there has been an increase in wildlife rehabilitation (Fraser and Moss, 1985) due to increases in displaced wildlife, as a consequence of increased urbanisation and human activities in areas previously occupied by wildlife (Karesh, 1995; Hutchins, 2003). Development has caused habitat degradation and fragmentation (Gill, 2007; Rodríguez et al. 2010; Baur, 2011; Lunney, 2012), causing isolation in some seabird populations (Trathan et al. 2015). It is, therefore, not a surprise that the admission of wildlife to rehabilitation centres across South Africa is as a result of the animals' association and proximity to humans (Wimberger et al. 2010).

Wildlife rehabilitation was established as a response to the crisis of the declining wildlife population by concerned members of the public who looked after animals for their intrinsic value (Wimberger et al. 2010); as well as the welfare of individual animal species (Moore et al. 2007). Although the goals of wildlife rehabilitation elicited polarised attitudes (Moore et al. 2007), some regarding it as neither good nor bad (Karesh, 1995). It was clear that others viewed the negative aspect of wildlife rehabilitation as a process interfering with nature or contributing negatively to conservation (Wimberger et al. 2010). On the contrary, it is seen by some as a crucial responsibility in nature conservation to ensure the well-being of species (van Dijk, 2005). Despite these polarised views, the rehabilitation of seabirds through various wildlife rescue and veterinary networks has yielded benefits (Montesdeoca et al. 2017). Developing countries, in particular, have seen an increase in the number of rehabilitation centres emerging (Karesh, 1995; Brossy et al. 1999). This, therefore,

requires a need to make wildlife rehabilitation an integral part of a broader wildlife management (Karesh, 1995). Overall, there is a general agreement that there is value in the Wildlife Rehabilitation Centre (WRC). Wildlife rehabilitation centres aim to rehabilitate wildlife effectively and release it in as little time as possible. This is because each day that an animal spends in rehabilitation, there is a cost associated with it. This cost includes food, staff and veterinary care (Molina-López et al. 2017). The deficiency in the necessary financial support may compromise the quality of care. It is therefore crucial that quality assessment and control in seabird rehabilitation centres exist to serve as an indicator that will assist in regulating the current modern wildlife health system to standardise the quality of care. Globally, there are published guidelines addressing welfare rehabilitation standards (Molina-López et al. 2013).

2.3.2 Modern responsibilities of seabird rehabilitation centres

Modern rehabilitation centres aid in conservation efforts directly and ensure the long-term survival of species (Miller et al. 2004). While the function of seabird rehabilitation has predominantly been to clean oiled birds, the focus has changed in an attempt to stabilise or augment wild populations (Karesh, 1995) and minimising man's adverse impacts (Wimberger et al. 2010). Seabird rehabilitation centres are playing a crucial role in nature conservation and biodiversity by ensuring that the affected seabirds are returned to the wild (Wimberger et al. 2010). They also use seabirds not deemed fit for returning to the wild for public awareness and education; as well as to understand animal behaviour (van Dijk, 2005; Nijma, 2006; Wimberger et al. 2010). This is most notable in campaigns such as "Penguin Promises" and "Penguin Festival," among others. Although, seabird rehabilitation has been a debatable issue for some time, and the practice of rehabilitation has not been immune to scepticism (Wimberger et al. 2010), the experience obtained from the rehabilitation processes has aided in developing technologies that yielded better success rates (Underhill et al. 1999; Golightly et al. 2002).

Efforts by rehabilitation centres have evolved from by not only focusing on caring for individual species in human care, but also by conserving global biodiversity, through dealing with issues of habitat and ecosystem restoration (Hutchins, 2003; Baur, 2011; Molina-López et al. 2017) while promoting natural behaviour (Newberry,

1995). Rehabilitation centres have realised that seabirds are an integral part of the marine ecosystem, therefore releasing them in areas where they are still present (van Dijk, 2005). These institutions are using innovative ways to move away from only visitor recreation to the community service for the conservation of both the species and the habitat it requires to survive (Miller et al. 2004). Seabird rehabilitation centres can help influence decisions regarding the conservation of remnants of biodiversity (be it natural or semi-natural habitats) as well as encouraging 'free' living of species while in captivity (Baur, 2011). This inclusive conservation approach needs to ensure that concepts such as "Adopt-a-Park" are embraced to provide direct assistance to national parks, reserves and other forms of conservation areas (Baur, 2011). They are referred to as "cooperative population management", as they have incorporated genetics and demographic management in their approach (Newberry, 1995; Hutchins, 2003), provided the species housed have traceable genetic origin (Soorae, 2005). Seabird rehabilitation can also assist reputable zoos and aquariums by providing seabirds that cannot be released into the wild for use in captive breeding and reintroduction programmes. There is an increase in the formation of regional cooperative breeding programmes (Hutchins, 2003). Collective planning between these facilities is pertinent to ensure systematic and collaborative management of species to sustain them (Soorae, 2005; Hutchins, 2003).

2.3.3 Benefits derived from Seabird Rehabilitation Centres

Once the animal has been released from rehabilitation, there are direct benefits derived from the rehabilitation of seabirds, including the improvement in the welfare of the rehabilitated animal; reinforcement to the natural population as well as the identification of factors affecting the well-being of the animal (Molina-López et al. 2013). The viability of seabird rehabilitation centres relies on collections from nature (Miller et al. 2004). This mission (*raison d'être*) has strong conservation ties and requires a set of guidelines to be in place to ensure their success; as well as easy evaluation by regulators to guarantee that the mission of conservation is achieved (Miller et al. 2004). The inclusion of the conservation work carried out by seabird rehabilitation centres to tie in with government policies has been something that has been lacking since their establishment, but, can aid in better decision-making with regard to seabird conservation efforts (Miller et al. 2004). This affords the opportunity

for seabird rehabilitation centres to influence policy and procedures to minimise harm during rehabilitation (Sleeman and Clark Jr, 2003). Other benefits of seabird rehabilitation centres are to ensure that there is no disjuncture between *ex-situ* and *in-situ* conservation efforts (Nijman, 2006); and secondly, fully legitimise these institutions (through permitting) to provide an enabling environment for them to acquire funding (Wimberger et al. 2010). In most cases, financial commitment defines policy as well as access to scientific staff (whether in-house or through agreements with other institutions) for evaluating conservation projects and their outcomes regarding policy and success (Miller et al. 2004). These relationships can also ensure that by regulating the biological collections of seabird species, other environmental and ecological questions are addressed (Pyke and Ehrlich, 2010).

Seabird rehabilitation centres are collection-based institutions and must be advocates for advising decision-makers about specific conservation issues (Miller et al. 2004). They hold valuable and entrusted information about the environment, and they can influence public perceptions through various media platforms (press conferences, public speaking, newspaper articles and editorials, magazine articles and television) to affect conservation and education needs while reinforcing positive values and beliefs on biodiversity (Di Minin et al. 2015). The inclusion of members of the public in the planning stages has been seen to have a positive impact on the rehabilitation programme (Peyton and Plenge, 2005). Seabird rehabilitation centres need to educate communities and raise awareness in urban areas where habitats have either been destroyed or altered; as well as where there are hotspots of anthropogenic activities affecting seabirds (Hutchins, 2003) and to define the challenges broadly not only from an ecological view (Peyton and Plenge, 2005). They also need to use the experience gathered to find new and efficient ways to form political backing and ensure some alignment with their efforts (Soorae, 2005).

Seabird rehabilitation practices in South Africa need to rise to the level of international recognition. In turn, South African SRCs can request assistance from successful developed countries. These requests need to be done in an ethical manner that aims to improve the practice of seabird rehabilitation and benefit seabirds, rather than individual organisations and for personal agendas. Some of the ethical issues that affect the running of rehabilitation centres may include animal

welfare concerns, attitude by the local communities; professional development of staff; veterinary concerns; ecological and population issues as well as financial matters (Karesh, 1995).

Some benefits that are derived from proper and well-functioning seabird rehabilitation centres are:

- Improvement in the skills acquired for the management of seabirds in captivity (Hutchins, 2003). The knowledge gained through the rehabilitation of seabirds by these facilities is essential in providing a source of expertise in the treatment of endangered species (Fraser and Moss, 1985).
- Improved husbandry capabilities through various streams of research by partnering with various academic institutions and developing effective relationships with scientists and researchers (Hutchins, 2003; Fraser and Moss, 1985; Nijman, 2006).
- Rehabilitation centres may also produce healthy seabirds that cannot be released into the wild but can be used in breeding and research programme (Fraser and Moss, 1985). Confiscated seabirds from illegal operations can be placed in reputable facilities where they can form part of public awareness of the illicit trade and welfare issues (Soorae, 2005).
- Improved record-keeping and data management (user-friendly, web-based packages). Hutchins (2003) indicated that there is a Global Animal Data Group (GADG) that is aimed at a collective data management system for all zoos and aquariums across the globe. The number of injured, sick and abandoned seabirds released need to be a significant fraction of the total population that was taken in for rehabilitation (Fraser and Moss, 1985).
- Rehabilitation centres can provide an essential vehicle for public education and awareness raising (Peyton and Plenge, 2005). These programmes can inform the public about the plight facing seabirds and their habitat, which may require a response by the public, thereby promoting effective wildlife management (Fraser and Moss, 1985). Fraser and Moss (1985) indicate that the personal feeling of fulfilment reaped by wildlife rehabilitators is similar to that enjoyed by hunters and bird-watchers.

- Rehabilitation programmes also strengthen agency relationships with constituencies through responsiveness to challenges surrounding wildlife and so improve the voluntary contributions from them (Fraser and Moss, 1985).
- Data collection as well as public awareness and education ensure better decision-making (van Dijk, 2005; Wimberger et al. 2010) and rallying the support and interest of people to care for such conservation causes (Fraser and Moss, 1985).
- They assist in optimising economical resources and for the welfare of animals (Molina-López et al. 2015).
- The commitment towards training and ongoing monitoring (Fredriksson, 2005).
- Ecological and population benefits

Seabird rehabilitation centres play a crucial role in the attempt to reinforce populations where there has been population destabilisation (Karesh, 1995). Some of the important work in ensuring that the outcome of rehabilitation is successful is to ensure that seabirds are fitted with passive integrated transponders (PITs) or tags that would enable them to be identified in the wild (Zangmeister et al. 2009). Other means include developing population modelling techniques based on the population census and distribution data obtained from the PIT or any other markings on the seabird (Bohec et al. 2007). This also allows the researchers to see whether the released seabirds affect the viability of the population and whether seabirds released in new areas return to their natal colony (Zangmeister et al. 2009). Other benefits include the addition of new individuals to the population (Soorae, 2005) thus confirming the importance of seabird rehabilitation centres to maintain and protect fragile populations by augmenting the population with captive-bred populations (Nijman, 2006).

- Political support

The success of the rehabilitation can make a powerful political statement especially of key species such as the African Penguin (Soorae, 2005). Political support can also at times focus on cosmopolitan and endangered species that have already the much needed international attention, leading to less cosmopolitan species going unnoticed (Karesh, 1995). The charismatic species such as the African Penguin generate a lot of media hype, receive attention both nationally and internationally due to the public opinions which require a

responsive action by the government (Simpfendorfer et al. 2011). The decline of African Penguins has resulted in the Department of Environmental Affairs gazetting the African Penguin Biodiversity Management Plan (RSA, 2013b) in October 2013, following a workshop arranged by various organisations to consolidate and establish a coordinated approach to the different aspects of African Penguin conservation (RSA, 2013b). Another example of a responsive approach by the government include the interactions with longline fisheries such as tuna *Thunnus* species. (Petersen et al. 2007). Moreover, fishing of the demersal Patagonian Toothfish (*Dissostichus eleginoides*) caused the death of about 300 000 seabirds as a result of by-catch (Brothers et al. 1999, Gilman 2001, Petersen et al. 2007). The initiative led to regularly reporting on by-catch and seeking alternative new technologies which will have minimal impacts on seabirds (Petersen et al. 2007). Therefore, it is important for managers of seabird rehabilitation centres to develop a prudent diplomatic and professional approach when political heads are addressed (Karesh, 1995). It is also important that as far as possible, seabird rehabilitation attempts should align their operations to attract political heads to effect the greatest conservation impact as well as to increase public awareness without compromising on the well-being of the species involved (Karesh, 1995).

2.3.4 Challenges facing Seabird Rehabilitation

Numerous factors affect the running of seabird rehabilitation operations. These challenges include, but are not limited to:

a) Animal Welfare concerns

The main reason why animals are released from rehabilitation centres is the increased concern by society members for the well-being of the individual species. In parts of North America and Europe, the perception of animals in captivity has led to the development of programmes that are supported and influenced throughout the political, economic and cultural spheres. In parts of the United Kingdom, the concern for the environment was a movement initiated by the concern by middle-class citizens who were sensitised by the rapid decline of species and their extinction (Karesh, 1995). They were also appalled by conditions that species in captivity were found in (Connelly et al. 2012; Miteva et al. 2012). Some conditions that were observed by the local communities included animals kept in facilities that were below

par to maintain their physiological and psychological health needs (Karesh, 1995). Facilities mainly depend on sound financial resources to ensure that the quality of care in rehabilitation centres is maintained, and this is no different for seabird rehabilitation centres (Molina-López et al. 2013).

Lack of funding for wildlife rehabilitation centres is a reality in developing countries with minimal support from the government (Karesh, 1995). This forces rehabilitation centres to come up with alternative measures to ensure that the quality of care for seabirds is maintained, despite extreme veterinary care and other associated costs to safeguard that full rehabilitation has taken place for the species before release, in order not to undermine the species' welfare (Karesh, 1995; Molina-López et al. 2017). Post-release monitoring of species is required to guarantee that the reintroduction and the reinforcement of the population do not harm other wild animals in colonies, because not all facilities have the financial means to fully assess the effects of rehabilitation due to lack of funding (Karesh, 1995; Wimberger et al. 2010). Post-release monitoring also measures the effectiveness of rehabilitation against other species in the wild. Other concerns of welfare emanate from seabirds that cannot be released back into the wild where alternative accommodation in permanent captive institutions is the only viable option apart from euthanasia (Karesh, 1995; Johnson, 2012). In some cases, euthanasia is a humane solution to end the animal's suffering than to remain in the captive environment. Time spent in captivity (Fredriksson, 2005) is important as in some cases this may lead to habituation (Huber, 2005) and animals may need to learn foraging skills and burrowing, as in the case of some seabirds (Fredriksson, 2005).

b) The attitudes of local communities

The local perceptions and attitude towards animals are important and vary between the various socioeconomic classes, cultural groups and religious affiliations (Karesh, 1995; Khan, 2002). The success of seabird conservation relies on public acceptance and support (van Dijk, 2005). Negative perception, although in some cases this does not exceed 15% of the community, may cause sufficient opposition to the whole programme (van Dijk, 2005).

Seabird colonies, especially land-based colonies such as Stony Point in Betty's Bay and Boulders in Simon's Town, are particularly vulnerable to public perceptions where nesting African penguins are deemed as undesirable by some community members (Karesh, 1995). The undesirability of these species raised by community members rests upon numerous health concerns and include the smell of guano and guano dust among others (Pyatt, 2003). This is also following historical perceptions where African penguins were useful for their eggs, guano and feathers. Currently, a study needs to be conducted to understand the beliefs and attitudes of the communities closest to the colonies, to understand local attitudes and attempt to find ways in which conflicts between humans and the species are minimised, so that the communities develop a new found respect and are nurturing towards seabirds (Karesh, 1995). These 'case studies' can be used to educate the public and increase public awareness about conservation efforts and issues. These areas, including the nearby rehabilitation centres, can partner in their efforts to raise awareness. This includes tourists to form part of tours and to volunteer at rehabilitation centres to understand the process and research conducted at these facilities for a nominal fee which can assist to generate some funds for the rehabilitation centre (Karesh, 1995). This should be an inclusive process with the local community, where they can volunteer without paying for the experience. The message of conservation needs to be carried out as clearly as possible, so as not to give the wrong message to the public regarding keeping animals in captivity for self-pleasure (Van der Veer and Pierce, 2003). Another matter is to ensure that local communities are skilled, or are required to assist in order to minimise the perception that donor funding only goes towards animal welfare, while pressing social issues are disregarded (Russell et al. 2003). This further creates negative attitudes and counteracts the progress made in improving public perceptions and attitudes towards seabirds (Karesh, 1995).

c) Professional development

There is a need to include the provision of individual training in the care and handling of seabirds to minimise the shortage of skilled staff (Karesh, 1995). The handling and caring of seabirds require expertise (Ruoppolo et al. 2013), one of the important things in developing skilled staff is to ensure that this field is included in the curriculum where various universities and organisations partner with seabird rehabilitation centres, to allow students and members of society to volunteer and

utilise training students and members of the public (Kaufman et al. 2004). This will assist in the development of skills in this area and increase the capacity required to handle endangered seabird species (but also assist during disasters such as disease outbreaks and oil spills). The training can also be extended to researchers, scientists, university graduates, field workers and managers involved in the conservation of seabirds under the supervision of those who have the skill and expertise in seabird rehabilitation (Karesh, 1995). These people are most likely to come across injured, abandoned or diseased seabirds. It is, therefore, important that they be able to conduct the proper animal evaluation, collect required samples and to identify the various diseases (Karesh, 1995).

d) Wildlife health issues

The inclusion of seabird rehabilitation in veterinary schools will allow veterinarians to not only be familiar with the rehabilitation process, but it will also ensure that medical information of species can be easily accessed enabling them to deal with health risks affecting seabirds and improve decision-making (Karesh, 1995). Partnerships with local veterinarians and veterinary schools are important in seabird rehabilitation to ensure that they participate actively in assisting rehabilitation centres where veterinary care is required (Sainsbury et al. 2001; Kaufman et al. 2004).

e) Cost

Conservation and seabird rehabilitation operate on a shoestring budget (Wimberger et al. 2010). Seabird rehabilitation centres have to deal with the high costs of quality food, medication, tests, veterinary care, and technical equipment essential for successful rehabilitation as well as properly skilled staff (Karesh, 1995; Fraser and Moss, 1985; Soorae, 2005). The government's financial resources are mainly allocated to social needs; however, when taking into account the anthropogenic threats that seabirds endure (Trathan et al. 2015), both on land and at sea, financial allocations or subsidies are required to assist in rehabilitation costs (Fraser and Moss, 1985). Also, the prevention of the proliferation of seabird rehabilitation will allow few facilities to maintain the quality of care without further reduction of the financial support available (RSA, 2007b). Private donors and government must be urged to shift priorities and understand the value of such programmes from a socio-economic perspective (Karesh, 1995). In some cases, reducing some of the

operational risks in other industries may inadvertently have a positive outcome on the cost of seabird rehabilitation i.e. financial responsibility of cleaning and rehabilitating oiled seabirds need to be carried by the responsible company (Nepstad et al. 2006). However, this requires government departments to improve their working relations, communicate more effectively and to be more synchronised in planning and action (Hamann et al. 2000). The majority of running costs are covered by rehabilitation centres. The main objectives of rehabilitation centres are to maximise benefits and minimise costs (Fraser and Moss, 1985). Industries whose activities affect seabirds need to contribute financially to seabird conservation organisations, to help these organisations advance government's mandate of sustainable development (RSA, 1998b). A policy taking into account the benefits and costs of rehabilitation needs to be carefully considered, through consultation with the various departments and their stakeholders; as well as through science-based policies that encourage few rehabilitation centres with multiple objectives (Fraser and Moss, 1985; Soorae, 2005).

Therefore, by addressing the above-mentioned challenges, seabird rehabilitation centres can provide the necessary information needed to make the necessary management and policy-related changes.

CHAPTER 3: ENVIRONMENTAL LEGISLATION ON SEABIRD REHABILITATION

3.1 Background

South Africa's environmental policies and legislation were entrenched in colonial ideologies that were predominantly wildlife-centred and preservationist, benefitting the minority (Kepe et al. 2005). This ideology was a concept which appealed mainly to the affluent, educated, and largely white minority (Khan, 2002) and reinforced the notion that indigenous biodiversity was mismanaged and under imminent threat through misuse by indigenous people (Sowman et al. 2011). South Africa was part of numerous conventions but was later excluded, due to its apartheid policies (Vrancken, 2011). The new democratic South Africa was re-accepted into the international community in 1994. Since the new legislative dispensation, South Africa is now a signatory to numerous international conventions that aim to preserve its marine resources and to protect its marine environment (Vrancken, 2011). The first democratic election of 1994 became a catalyst for change in South Africa's legislative arena (Wynberg, 2002). This was aimed at improving the quality of life of many South Africans, as well as providing equitable redress (Kepe et al. 2005).

The dawn of the new democratic government of South Africa saw the emergence of the new inclusive Constitution (van der Linde and Feris, 2010). This was done to significantly revise the policies and legislation aimed at addressing the legacy of the apartheid era and achieving equality in the life of all South Africans (Cochrane et al. 2015). The Constitution of the Republic of South Africa (No. 108 of 1996) (RSA, 1996) came into being in 1996 and is the supreme law of the country, overriding any law and/or conduct that is inconsistent with its provisions (van der Linde and Feris, 2010; Hamann et al. 2000; Cochrane et al. 2015; Wagener, 2005;).

The Constitution of the Republic of South Africa (No. 108 of 1996) (RSA, 1996) was ratified by the Constitutional Court in 1996 after being drafted by the Constitutional Assembly (Hamann et al. 2000). The process of drafting the new constitution commenced in the early 1990s by participants from the various political parties, after having formed the Multiparty Negotiation Process in 1993 (Hamann et al. 2000). The Multiparty Negotiation Process was responsible for the development of sets of

principles to which they agreed. These are known as the Constitutional Principles. These principles set the precedent, as well as laid the foundation for effective implementation of South Africa's current regulatory framework and integrated public management (Hamann et al. 2000).

The Constitution of the Republic of South Africa (No. 108 of 1996) affords every person equality of rights and freedoms enshrined in chapter 2, namely the Bill of Rights (RSA, 1996). This Bill of Rights includes among others the freedom to human dignity; equality; freedom of religion, belief and opinion; access to health care, food, water and social security as well as the environmental rights. Section 24 of the Constitution states that *"Everyone has the right –*

- a) To have an environment that is not harmful to their health or well-being; and*
- b) To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other means that –*
 - (i) Prevent pollution and ecological degradation;*
 - (ii) promote conservation; and*
 - (iii) secure ecological sustainable development and the use of natural resources while promoting justifiable economic and social development"* (RSA, 1996).

The above environmental rights place a constitutional obligation on government (including all spheres of government as well as its state entities) to ensure the protection of the environment (Hamann et al. 2000) for everyone in South Africa (De Wet & Du Plessis, 2010). They also invoke a constitutional mandate for an effective ecosystem approach to environmental management (Cochrane et al. 2015). The clause in Section 24(a) has been widely criticised for being too anthropocentric, in that it failed to address the conservation of resources as well as ecological processes (Hamann et al. 2000). This means that this is a view of humanity where humans are the central point (Du Plessis, 2008), i.e. Section 24 refers to the 'present and future generations' and the National Environmental Management Act (No. 107 of 1998) ("NEMA") (RSA, 1998b) has a section known as the NEMA Principles which include Sustainable Development.

South Africa's Constitution (RSA, 1996) also provides for a concurrent management approach in environmental governance in South Africa through the national,

provincial and local government systems (Vrancken, 2011). It has been widely indicated that the institutional framework of environmental policy has not been clearly defined in the enactment of the Constitution, thus resulting in overlapping mandates among the various government departments. Another matter that requires a review is the clear separation between the implementation and monitoring functions of the three spheres of government (RSA, 1996; Rossouw and Wiseman, 2004).

3.2 Environmental legislation governing Seabirds and Seabird Rehabilitation

South Africa's legislative history on the protection of seabirds and seabird rehabilitation centres was almost non-existent (Adv. N. de Kock 2016, personal communication, 4 June). These issues were conflated with the idea of 'nature conservation' which South Africa was then good at. The concept of nature conservation was equated to biodiversity management, which in turn resulted in the establishment of protected areas. This is how the majority of seabird colonies were 'protected'. Prior to 1994, the apartheid government created fragmented and uncoordinated institutions, resulting in fragmented decision-making (Wynberg, 2002; Pence et al. 2003). Below are the various laws, aimed at the conservation of seabirds and regulation of seabird rehabilitation centres:

3.2.1 The Sea Birds and Seals Protection Act (No. 46 of 1973) ("SBSPA")

The Sea Birds and Seals Protection Act (No. 46 of 1973) ("SBSPA") (RSA, 1973) was promulgated more than 40 years ago and was amended two years later in 1975 under the General Law Amendment Act (No. 57 of 1975) (RSA, 1975). The Act was promulgated to *"provide for the control over certain islands and rocks; for the protection, and the control of the capture and killing, of sea birds and seals; and for the disposal of the products of sea birds and seals and matters incidental to it"*. The Sea Birds and Seals Protection Act repealed the Fish Protection Act (No. 15 of 1893) gazetted by the Cape of Good Hope as the Sealing and Fisheries Ordinance mainly aimed at controlling the killing of seals (RSA, 1973).

The Sea Birds and Seals Protection Act (No. 46 of 1973) (RSA, 1973) defined seabirds to be from the following families *Spheniscidae* (Penguin); *Sulidae* (Gannet); *Phalacrocoracidae* (cormorant); *Laridae* (gull); *Sternidae* (tern); *Pelicanidae*

(pelican); *Diomedidae* (albatross); *Procellariidae*, *Thalassidromidae* or *Oceanidae* (petrel), *Podicipidae* (dabchick), *Threskiornithidae* (ibis), *Stercorariidae* (Skua), *Charadriidae* (wader), *Haematopodidae* (oystercatcher), *Phalaropidae* (Phalarope), *Phoenicopteridae* (flamingo) and *Chionidae* (sheathbill) (RSA, 1973).

The Sea Birds and Seals Protection Act (RSA, 1973) ensures the protection of seabirds and their breeding grounds in all 35 islands within South Africa's territorial waters (Attwood et al. 1997b). This also stated that no person may set foot on these islands without the permission of the Minister (Attwood et al. 1997b). There increased conflicts in the 1890s mainly for guano islands, estuaries and bays, trout as well as rock lobsters (Sowman et al. 2011). The islands where guano was collected were initially managed by private lessees before being taken over by the state to provide fertiliser subsidy to wheat and wine farmers mainly in the Western Cape (Sowman et al. 2011). The protection of these islands was solely for the benefit of industry, to acquire economic advantage from guano production, seal skin and egg harvesting (Sowman et al. 2011).

3.2.2 The Marine Living Resources Act (No. 18 of 1998) (“MLRA”)

The Marine Living Resources Act (No. 18 of 1998) (“MLRA”) (RSA, 1998a) is a regulatory framework which was introduced in 1998 to regulate measures for the conservation of the marine ecosystem as well as the access and long-term sustainable utilisation and protection of marine living resources (RSA, 1998a). The MLRA was the mandate of the then Department of Environmental Affairs and Tourism (DEAT), which later changed to the Department of Environmental Affairs (DEA) (Adv. N. de Kock 2016, personal communication, 4 June). In 2010, the powers and functions of the MLRA were transferred to the Department of Agriculture, Forestry and Fisheries (DAFF) following the “split” between the DEA and the DAFF (Cochrane et al. 2015).

The “split” resulted in the fragmentation of the environmental legislation where Marine Protected Areas (MPAs), non-consumptive utilisation of protected species such as Boat-Based Whale Watching (BBWW) and White Shark Cage Diving (WSCD) remained in the Act and other protected species were regulated under the National Environmental Management: Biodiversity Act (No. 10 of 2004) (“NEM:BA”)

(RSA, 2004). In 2013, a proclamation (Proclamation No. 36527 of 2013) (RSA, 2013a) by the President of the Republic transferred some of the powers and functions within the Marine Living Resources Act (No. 18 of 1998) to the Department of Environmental Affairs (RSA, 2013a). Following the “split” and the transfer of powers and functions through the proclamation, the Department of Environmental Affairs transferred the section on Marine Protected Areas (MPAs) by amending the National Environmental Management: Protected Areas Act (No. 57 of 2003) (RSA, 2003) (Adv. N. de Kock 2016, personal communication, 4 June). This process was finalised through the gazetting of the National Environmental Management: Protected Areas Amendment Act (No. 21 of 2014) (RSA, 2014c).

In 2007, the Policy on the Management of Seals, Seabirds and Shorebirds (PMSSS: 2007) (RSA, 2007b) was gazetted under the Marine Living Resources Act (No. 18 of 1998) (RSA, 1998a). The administration and responsibility for this Act rested with the Department of Environmental Affairs, following the powers given to them by the President. The Policy on the Management of Seals, Seabirds and Shorebirds aimed to address some of the challenges related to seabirds since the Seabirds and Seals Protection Act had, at the time, not been amended in over 32 years (RSA, 2007b). Furthermore, this policy was to inform the revision of the legislation on seabirds and seals (RSA, 2007b). The policy addressed challenges faced by seabirds and seals which included incidental capture by fisheries; degradation of breeding habitat; disturbance by humans; insufficient food; and oil pollution. Moreover, the policy under 4.1.10 on Oil Pollution, suggested that “*contingency plans, networks and rehabilitation facilities for the rescue and subsequent rehabilitation of birds that are oiled or orphaned should be developed*”. It also cautioned against the “proliferation of rehabilitation facilities”, and that specific rehabilitation facilities should be identified to lead in the care of seabirds (RSA, 2007b).

3.2.3 The National Environmental Management Act (No. 107 of 1998) (“NEMA”):

The pre-democratic legislative dispensation in South Africa on environmental management was fragmented and uncoordinated (Hamann et al. 2000; Rossouw and Wiseman, 2004). In 1997, a White Paper on the Conservation and Sustainable Use of South Africa’s Biological Diversity (RSA, 1997) was published (Kepe et al.

2005). This development led to policy processes being initiated which encompassed various aspects of biodiversity conservation (Wynberg, 2002). The policy process was led by formal structures which ensured that there was consultation with the different stakeholders including civil society (Wynberg, 2002). From this process, the National Environmental Management Act (No. 107 of 1998) (RSA, 1998b) (“NEMA”) was promulgated. The National Environmental Management Act (RSA, 1998b) is a legal framework that gives effect to Section 24 of the Constitution (RSA, 1996). NEMA is seen as the overarching environmental legislation in South Africa and can be referred to as the “Mother Law” on the environment in the country (Hamann et al. 2000; Rossouw and Wiseman, 2004; Sowman et al. 2011; RSA, 1998b). The Act was drafted with the intention of providing a new legislative dispensation on environmental matters and repealed a large part of the Environmental Conservation Act (No. 73 of 1989) (“ECA”) (RSA, 1989) (van der Linder and Feris, 2010). This was because the Environmental Conservation Act did not adequately address matters relating to environmental management and conservation in South Africa (RSA, 1989; Rabie, 1992).

NEMA (RSA, 1998b) highlights the need for cooperative governance and intergovernmental relations, as well as a more holistic approach required to ensure environmental protection and the concomitant need to promote socio-economic development (Hamann et al. 2000; Rossouw and Wiseman, 2004). These structures of cooperative governance, as well as integrated environmental management (IEM), provide for a participatory approach to environmental management through extensive stakeholder engagement and inclusivity, with an appropriate capacity building that guarantees equitable participation (Rossouw and Wiseman, 2004; Sowman et al. 2011). This approach is also difficult in practice (Rossouw and Wiseman, 2004), but the inclusion of civil society in decision-making was seen as a breakthrough in environmental management, undoing the wrongs of the apartheid-era laws (Sowman et al. 2011). The NEMA further highlights its intention for concurrent functioning between national and provincial authorities to further improve environmental management (Hamann et al. 2000; Rossouw and Wiseman, 2004).

To address matters relating to cross-boundary marine biodiversity, such as those of seabirds, NEMA (RSA, 1998b) allows the Minister of Environmental Affairs to make

a recommendation to Cabinet and Parliament regarding the ratification of and compliance with an international environmental instrument (Vrancken, 2011). South Africa can be bound to a treaty if that treaty is of a technical, administrative or executive nature and does not require ratification of accession (Vrancken, 2011). Such agreement does not need the approval of Parliament. Other treaties will only bind the Republic once they have been approved by both houses of Parliament. The provisions in NEMA also allow the Minister of Environment to publish in the Government Gazette the provisions of an international environmental instrument to which South Africa is bound and any amendment or addition to such an instrument (Vrancken, 2011).

The State can fulfil its constitutional mandate of promoting conservation of its biological resources through reasonable legislative, administrative and other measures (Kotze & Du Plessis, 2006). These, among others, include legal means through acts, policies, regulations, Norms and Standards to name a few (RSA, 1998b; RSA, 2004). Administrative means include permits, compliance and enforcement measures as well as management plans. Following the enactment of NEMA (RSA, 1998b), five Specific Environmental Management Acts (SEMA) were developed to provide legislative provisions on the various aspects affecting the environment. These include the National Environmental Management: Protected Areas Act (No. 57 of 2003) (NEM:PAA) (RSA, 2003); National Environmental Management: Integrated Coastal Management Act (No. 24 of 2008) (NEM:ICMA) and the National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA) among others. Only the National Environmental Management: Biodiversity Act will be discussed in detail, with regard to how it affects seabird rehabilitation facilities in South Africa and how it can be used to assist in the conservation of seabirds.

3.2.4 National Environmental Management: Biodiversity Management Act (No. 10 of 2004) (“NEM:BA”):

The National Environmental Management: Biodiversity Act (No. 10 of 2004) (“NEM:BA”) (RSA, 2004) provides a legislative framework for the conservation and management of the country’s biodiversity. The Act also covers the protection, conservation and management of threatened species and ecosystems that are in

need of protection; sustainable use of the country's biological resources, as well as the fair and equitable sharing of bioprospecting of indigenous biological resources (RSA, 2004). South Africa's rich biodiversity comprises many endemic species including birds (Crawford, 2007). However, the socio-developmental phase that South Africa is currently going through may burden the country's rich biodiversity (Kotze & Du Plessis, 2006). The three pillars identified in NEMA, social; economic and ecological, need to be balanced to minimise the rate of biodiversity loss, as is observed in seabirds and their habitat. The NEM:BA has been said to be a relatively safe Act and is commendable in its approach to biodiversity matters. However, the interpretation, implementation and enforcement of this legislation have been questioned (Kotze & Du Plessis, 2006). Furthermore, Kotze and Du Plessis (2006) have recommended that some aspects of the International Environmental Law (IEL) relating to biodiversity may assist government policymakers and enforcement units in implementing biodiversity management.

Threatened or Protected Species Regulations (TOPS)

In 2007, the gazette on Threatened or Protected Species (TOPS) Regulations (RSA, 2007a) was published in terms of Section 56(1) of the National Environmental Management: Biodiversity Act (RSA, 2007a). This provision affords the Minister the authority to publish a list of critically endangered species, endangered species, vulnerable species and protected species by notice in the Gazette (RSA, 2004). These are the species that are regarded to be of high conservation value and at high risk of extinction in the wild, whether in the immediate, near or over medium-term future (RSA, 2004).

The Regulations on Threatened or Protected Species (RSA, 2007a) are required to be reviewed every five (5) years, and in May 2017, the Department of Environmental Affairs gazetted the regulations on Threatened or Protected Marine Species (TOPMS) (RSA, 2017). These regulations cover most of the marine species, including the majority of seabirds that occur within the EEZ as well as the extended EEZ. The regulations also repealed the regulations on Boat-based Whale Watching (BBWW) and White Shark Cage Diving (WSCD) as well as the Policy on the Management of Seals, Seabirds and Shorebirds (RSA, 2007b) from the Marine Living Resources Act (No.18 of 1998) (RSA, 1998a) into the TOPMS Regulations

(Adv. N. de Kock 2016, personal communication, 4 June). The purpose of the Threatened or Protected Marine Species Regulations (TOPMS) (RSA, 2017) include, but are not limited to:

- a) Regulating the permit system outlined in Chapter 7 of the National Environmental Management: Biodiversity Act (No. 10 of 2004) insofar that the permit system applies to restricted activities involving listed threatened or protected marine species;
- b) Providing for the registration and regulation of facilities such rehabilitation centres, captive breeding facilities and sanctuaries, among others;
- c) Regulating the manner in which specific restricted activities involving listed threatened or protected marine species may be carried out.

The regulations require that any person who may carry out a restricted activity on a listed threatened or protected marine species needs to apply for a permit (RSA, 2017). In addition to the restricted activities in NEM:BA, the regulations further prescribe the restricted activities applicable to listed, threatened or protected marine species. These are: harassing a specimen; attracting and releasing a live specimen; feeding; as well as boat-based whale watching and white shark cage diving (RSA, 2017). The restricted activities applicable to seabird rehabilitation centres include harassment; releasing and feeding of listed seabird species. The 2017 TOPMS regulations define ‘harassment’ of seabirds as, *the insertion or attachment of a tag or other device to a threatened or protected marine species as well as disturbing, digging up or destroying nests or eggs*. Furthermore, the regulations have defined a rehabilitation facility as a “*facility equipped for the temporary keeping of a live –*

- a) Sick or injured specimen for the purpose of providing treatment of and care to such specimen; or*
 - b) Young orphan specimen for rearing purposes;*
- with the overall intent to release such specimen, but excludes a veterinarian’s practice or veterinary academic hospital.”*

Restricted activities towards a threatened or protected species ensure that the activity carried out on such a species is not to be of a nature that may negatively affect the survival of the species (RSA, 2017). In order for a seabird rehabilitation centre to handle seabirds, permits are required in order to conduct any of the restricted activities.

There are two types of permits that may be issued in terms of these regulations. They are the Ordinary permit and Standing permit. Ordinary permits are issued for a once-off carrying out of a restricted activity, and they are valid for a maximum period of 12 months. Further to this, there is a specific kind of Ordinary permit known as a permanent possession permit (RSA, 2017). This is to authorise the applicant with permanent possession of a listed, threatened or protected marine species for personal belonging; and is not intended for use for commercial purposes. Standing permits authorise the permit holder for the continuous carrying out of a listed activity involving one or more species. This type of permit is normally issued to rehabilitation centres and is valid for not more than 36 months (RSA, 2017).

The regulations also require facilities such as rehabilitation centres, sanctuaries and captive breeding facilities among others to register with the DEA. The purpose of the registration is not clear, since registered facilities would not be able to operate without a valid permit. Regulation 37 further outlines the various factors required when a facility is to be registered; and includes the purpose for which the rehabilitation facility is conducted, or whether the applicant is prepared to microchip or mark each specimen. Upon furnishing the issuing authority with the required documentation and information as well as meeting the compulsory conditions, the registration certificate would then be issued. The period of validity of the registration certificate is indefinite and is valid within the country (RSA, 2017).

Part 2 of TOPMS (2017) sets out the Permit application procedures. This section in the regulations informs the applicant of the necessary steps when applying for a permit. The copy of the permit application form is also gazetted with the regulations including the permit processing fee annexed to the regulations as Annexure 1 and 3 respectively. The regulations tell the applicant of the necessary documentation that needs to accompany the application form. These, among others, include a certified copy of the identity document or passport; as well as a proof of payment of the applicable processing fee. Submission of the application can be submitted electronically, by post or hand delivered. Regulation 10(6) requires rehabilitation centres to submit a rehabilitation plan with the application form. In addition to this, Regulation 10(7) provides minimum information required in the rehabilitation plan

with a provision under Regulation 10(7)(c), which indicates that the issuing authority may request additional information.

When considering a permit application, the issuing authority can request additional information (RSA, 2017). The applicant is required to furnish the issuing authority with the relevant information required within 90 working days. If such information is not received by the issuing authority, the application will be withdrawn. The applicant will then need to re-apply. Permits are not issued haphazardly, there are various factors that must be met when the issuing authority considers an application received from the applicant. These factors vary from whether there are any other legal requirements; the information and documentation submitted; the conservation status of the species and whether the restricted activity may have a negative impact on the species (RSA, 2017). The consideration for the application also takes into account the history of the applicant with regards to biodiversity matters. This is to ensure that persons previously convicted of biodiversity crimes are not awarded permits.

The regulations further outline circumstances in which the issuing authority may refuse to issue a permit. These, among others, include, if the application form is not signed; a processing fee has not been paid; as well as if there are discrepancies with any of the permit application procedures. To ensure that the permit is not transferred, there are specific details that the permit must contain. These include details of the permit holder, permit number and date of issue, specimens involved, and particulars of the restricted activity as well as the period of validity if applicable (RSA, 2017). Regulations 23 and 24 of the 2017 regulations, sketch the compulsory permit conditions of the permit holder and those applicable to rehabilitation facilities, respectively. They are included as Annexure 2 of this document. The issuing authority must decide on the permit application within 30 working days upon the receipt of the application. The regulations provide the applicant with the opportunity to appeal the decision of the issuing authority.

Significant Changes in the recent Amendment of the 2017 TOPS Regulations

There are noteworthy amendments to the Threatened or Protected Marine Species Regulations, published in 2017. Although the recent amendment are only for marine

species, there are some significant changes that have been included in the recent publication. This paper does not question the intention of the legislator but attempts to emphasize some of the practicalities of the regulations, with regard to seabirds and seabird rehabilitation centres. Some of the notable differences between the 2007 TOPS and the 2017 TOPMS Regulations are:

- a) The 2007 Regulations were limited in the listing of marine species in particular seabirds. The African Penguin, referred to in the regulations as Jackass Penguin, was the only seabird species listed. It is not clear as to why a policy on the Management of Seals, Seabirds and Shorebirds, gazetted in 2007 by the same Department comprising of a list of threatened seabirds, was not included in the 2007 TOPS Regulations.
- b) In chapter 1 of the 2017 TOPMS Regulations, activities prescribed as restricted activities were included for ease of reference. These regulations cross-reference applicable sections.
- c) There are some distinctions in how the recent gazette was drafted in comparison to its previous version. Although most of the provisions from the previous regulations were maintained, some have either been moved to other sections or have been refined with more detailed information. For example, Part 2 and 3 of the 2007 Regulations dealing with the application of the permit as well as the consideration of applications, contain similar information as Part 2 of the 2017 Regulations.
- d) Part 4 of the Regulations refers to the issuing of permits: the 2007 Regulations only provided for compulsory conditions for hunting permits. This was expanded in the recent Gazette where compulsory conditions for the holders of permits and various facilities including rehabilitation centres were incorporated.
- e) Different timeframes have been included in the recent Gazette. The 2007 TOPS Regulations required the issuing authority to consider and decide on an application within 20 working days. The timeframes to consider and decide on the application has been increased to 30 working days in the 2017 Regulations. Furthermore, the timeframes for requesting additional information has also been increased.
- f) Although the general purpose of the Registration Certificate has not been clearly outlined in the 2017 Regulations, there are amendments with regard to

the compulsory conditions. The compulsory conditions contained within the 2007 Regulations for registration were moved to compulsory registration for the different facilities in Regulation 24 of the 2017 Regulations. Registered facilities will not be able to carry out restricted activities without a valid permit. This is reiterated in Regulation 29(2) of the 2017 gazette.

3.2.5 National Environmental Management: Integrated Coastal Management Act (No. 24 of 2008) (“NEM:ICMA”):

The National Environmental Management: Integrated Coastal Management Act aims to protect the natural environment and provides for an integrated management approach for the coastal environment. Seabirds inhabit the coastal zone which is governed under this legislation.

3.2.6 National Environmental Management: Protected Areas Act (No. 57 of 2003) (“NEM:PAA”):

The purpose of this Act is provide protection and conservation of ecologically viable areas that are representative of South Africa’s biodiversity (RSA, 2003). Furthermore, it provides for the establishment of a national protected areas register; the management of those areas; as well as co-operative governance and public participation of matters relating to protected areas. This Act is important for seabird conservation as all the seabird colonies in South Africa are protected in terms of this legislation.

3.3 International Cooperation and Conventions relating to the conservation of seabirds

The support of these international instruments aims to provide a comprehensive environmental legal protection regime in domestic laws and are regarded as a high priority for the South African Government (Kotze & Du Plessis, 2006). South Africa’s constitution makes it a requirement to comply with international agreements to which the country is a signatory. In section 39(1)(b) of the Constitution, there is a requirement for courts to consider international law when the Bill of Rights is being interpreted. Also, sections 239(1) and 233 of the Constitution make it a requirement for courts to conform to international law, both those which are binding and non-

binding. The difference between binding and non-binding instruments is that binding instruments include treaties to which South Africa is a signatory. These are binding obligations and include the United Nations (UN) Security Council resolutions as well as customary international law. Non-binding instruments include those which are not open to ratification (RSA, 1996; De Wet & Du Plessis, 2010).

South Africa's national legislation supports a myriad of international conventions and Multilateral Environmental Agreements (MEA's) (Kotze & Du Plessis, 2006). The NEMA allows for the inclusion of international conventions to be adopted in the national legislation (de Wet & du Plessis, 2010). This means that South Africa, as part of the global community, requires being up to date on matters relating to international laws, allowing section 24 of the Constitution not to exist in a vacuum. South Africa is a signatory and an active member of numerous regional and international bodies that affect seabirds and which can also be used to pass resolutions regarding seabird rehabilitation facilities. These include, but are not limited to, the Convention on the Conservation of Migratory Species of Wild Animals (1979) (CMS) under which the Agreement on the Conservation of Albatrosses and Petrels (ACAP) exists. Others include the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR); Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES); Convention on Biological Diversity (1992) (CBD); the Antarctic Treaty (1959); and the Benguela Current Convention (BCC).

3.3.1 The Convention on Biological Diversity (1992) (CBD):

South Africa did not take part in the negotiation of this convention, however, ratified it in 1995 (Taylor & Wynber, 2008). The Convention on Biological Diversity was adopted at the Rio Summit in 1992 and came into force on 29 December 1993. The Convention has three main objectives:

- a) Conservation of biological diversity;
 - b) Sustainable use of the biological diversity;
 - c) Fair and equitable sharing of the benefits from the utilisation of genetic resources.
- There are sets of general principles outlined to achieve these main objectives. The CBD operates under various thematic programmes including mountain biodiversity,

island biodiversity, inland biodiversity, marine and coastal biological diversity, forest biodiversity, agricultural biodiversity and dry land and sub-humid land biodiversity.

3.3.2 The Convention on the Conservation of Migratory Species of Wild

Animals (1979) (CMS):

The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), came into force in 1979 with the main aim of global conservation of terrestrial, marine and avian migratory species (including their habitats) throughout their range. The CMS is under the sponsorship of the United Nations Environment Programme and allows countries to establish a legally founded agreement for the protection of these species, by mitigating obstacles within their migratory routes through establishing obligations for member states. The agreements within CMS range from legally binding treaties (also known as Agreements) to other informal instruments such as Memoranda of Understanding. Species are listed on Appendices I, II or III, depending on the threat status of the species, e.g. Appendix I listed species are species threatened with extinction. Under the CMS, the Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA) was established.

3.3.2.1 The Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA):

The Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA) is included in the Convention on Migratory Species (CMS) and administered by the United Nations Environment Programme (UNEP). AEWA covers migratory waterbirds that cross international borders during their migration and includes species such as grebes, pelicans, gannets, cormorants, herons, egrets, gulls, terns, African penguins and spoonbills, to mention a few. The AEWA has three main bodies: the Meeting of the Parties (MOP), which is a governing body of AEWA; a Standing Committee and the Technical Committees which are responsible for operational sessions of the MOP and provide scientific advice. South Africa and many countries are contracting parties to AEWA, working towards the conservation of these migratory species.

3.3.2.2 The Agreement on the Conservation of Albatrosses and Petrels (ACAP)

The Agreement on the Conservation of Albatrosses and Petrels (ACAP) came into force on 1 February 2004 following meetings in Australia and South Africa which were attended by 16 countries as well as international organisations. As of June 2015, 13 parties are a signatory to this agreement. This is a multilateral agreement aiming to conserve 22 world species of albatrosses and seven species of petrels. ACAP considers the maintenance of a global database to inform species' assessments. These include updated information on each of the species' distribution, threats faced, conservation measures and gaps in the knowledge about the species. Also, ACAP involves the funding of research projects, capacity building and environmental education and awareness.

3.3.3 The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES):

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is an international agreement between governments, ensuring that international trade does not threaten wild specimens. The CITES came into force on 1 July 1975 as a result of a resolution adopted in 1963 at the IUCN meeting. South Africa ratified CITES on 15 July 1975, and it came into force in October of the same year (RSA, 2013b). Like CBD, CITES has Appendices, under which various species are listed, based on the threat status of the species.

3.3.4 The Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR):

The Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) came into force on 07 April 1982. CCAMLR is an international commission with 25 members, and a further 11 countries have acceded to the convention. The convention aims to determine the best use of marine living resources in the Antarctic region, based on the available scientific information. The objective is the conservation of the Antarctic marine resources, following the increased commercial interest in the Antarctic.

3.3.5 The Benguela Current Convention (BCC)

The Benguela Current Convention, previously known as the Benguela Current Commission reflects cooperation between South Africa, Namibia and Angola. The vision of the BCC is to ensure the sustainable use and management of the Benguela Current Large Marine Ecosystem for the people of the region. The Convention works towards an integrated approach that is science-based through joint programmes.

CHAPTER 4: RESEARCH METHODOLOGY

4.1 Introduction

The current study followed a qualitative methodical approach, using a semi-structured questionnaire. A brief description of the study participants is provided, as well as the sampling method that was used. This includes the materials and instruments used in data collection and analysis.

4.2 Research Design

Data was collected using a survey by means of a semi-structured questionnaire. The questionnaire (Appendix 1) was derived from a study previously conducted by Wimberger et al. (2010). The sample included seabird rehabilitation centres registered under the Threatened or Protected Species Regulations (TOPS). By law, seabird rehabilitation centres are required to obtain a permit from the Department of Environmental Affairs, before their operation may commence. In this case, the national department is the issuing authority for marine species under the TOPS. The list of seabird rehabilitation centres was obtained from the Department, whose records indicate that there are six seabird rehabilitation centres in the country, five of which are registered with the Department and one, at the time of the study, had indicated their intention to apply for a permit. The rehabilitation manager or senior officials at rehabilitation centres were contacted via telephone or e-mail. The purpose of the study was explained in the letter, and a written acceptance of the request was received from the rehabilitation centre manager. This research deals with direct questioning of respondents, a process during which some confidential information might be revealed. The respondents were assured of their confidentiality, though the information can be used to further inform future studies or decision-making. The names of the rehabilitation centres have been kept confidential. Due to logistical limitations, personal visits could not be conducted to verify their responses.

The questionnaire (Appendix 1) was designed to inquire broadly about aspects governing seabird rehabilitation in South Africa. There are about 48 questions within the questionnaire. There were other supporting documents, such as the copy of the ethical clearance issued by the University, which included the contact details as well as individual consent to participate in the study. The questionnaire was comprised of

five sections titled: “General, Collection of Animals, The Release, Finance and Legislative Requirements”. The Likert scale questionnaire (Mears 1994) was used to determine the perception of seabird rehabilitation centres. Furthermore, the questions were structured with answers as multiple choice, which allowed the applicant to select as many options as possible. The questions also had “Other”, in case the options provided did not apply to the facility and to encourage them to add in their information. The number of rehabilitators that responded to the question is represented as “n”.

4.3 Data Processing and Analysis

The basic descriptive statistics such as the mean, percentages and standard deviations, among others, were used as primary methods of analysis of the collected data. Furthermore, to facilitate this process, a combination of electronic statistical packages: R statistical package (version 3.3.1), as well as the IBM Statistical Package for the Social Sciences (SPSS) version 24, was used. The existing theory was consulted on the design of the surveys and the qualitative interviews. Likewise, ethical considerations about the proposed methodology were explored, including the perceived significance of the proposed study and projected timelines.

4.4 Ethical Consideration

With regard to the context of research, ethics refers to the appropriateness of the researcher’s behaviour, in relation to the rights of those who become subjects of the study or are affected by it. The researcher needs to consider ethical issues throughout the research and to remain sensitive to the impact of their work on those whom they approaches for help, those who provide access and cooperation, and those affected by the study (Saunders et al. 2009). Ethical considerations were upheld for the duration of the study. Permission to conduct the study was obtained from the facilities, before the commencement of the study. Respondents were provided with the opportunity to participate in the study voluntarily and were not coaxed to take part in the study. Respondents also signed the informed consent form (Appendix 2). The principle of non-disclosure was followed, as the identities of the respondents were not revealed. It was also agreed that the research results would not be made available for use outside the agreement made with respondents. In

addition to the aspects above, all sources from which the information was obtained were acknowledged, as suggested by Goddard and Melville (2004).

CHAPTER 5: RESULTS

Seabird Rehabilitation Centres

Five ($n=5$) of the seabird rehabilitation centres in South Africa have responded to this survey. That is 83% (5 out of 6) of the total seabird rehabilitation centres known in the country. The majority of the seabird rehabilitation centres are in the Western Cape, with two in the Eastern Cape and one in KwaZulu-Natal. There are currently no known seabird rehabilitation centres in the province of Northern Cape. The oldest facility was established in 1952; with the newest only being in operation since 2015. Only one of the respondents has another satellite centre in another province and both facilities were considered as one.

Section A: General

Main responsibilities and functions of the facility

An overall interpretation showed that in analysing the measure on the function and responsibility of the rehabilitation centre, most values clustered around five of the scale, with '*seabird's conservation*', to '*provide education about seabirds with the aim of increasing awareness*' and '*caring for injured birds with the aim of releasing them back into the wild*' identified by the seabird rehabilitation centres as their main responsibilities (Figure 2). The results demonstrate that the main perceived functions and responsibilities of seabird rehabilitation centres are '*to care and help injured/orphaned seabirds with the aim of releasing them back into the wild*' and '*seabird conservation*'. These are regarded as the facilities' critical functions, with the ratings of 4 and 5. Another function and responsibility that seems to take precedence is that facilities are able to '*provide education with the aim of increasing compassion of seabirds*'. This has a range of between 3 and 5, slightly lower than that of '*caring and helping injured and orphaned birds as well as seabird conservation*'. The '*managing the interactions between seabirds and people*', as well as '*disease surveillance*', were not perceived as the core functions and responsibility of the facility, but were part of their operations. These ranged between 2 and 5 for both

these functions. The respondents from Wimberger et al. (2010), rated the following three as their main goals a) releasing animals back into the wild; b) caring and helping of injured/orphaned wild animals and c) education to prevent the problems in the future.

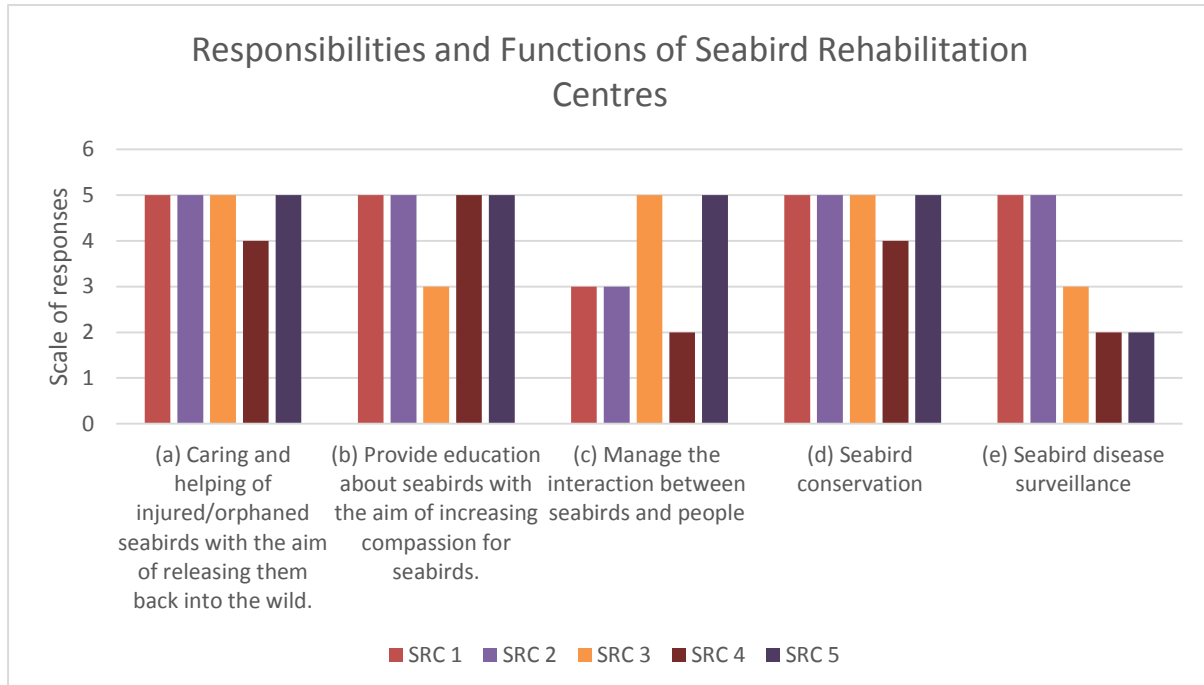


Figure 2: Main responsibilities and functions of seabird rehabilitation centre, according to order of importance (Minimal =1; High =5)

Challenges facing the facility

In analysing the measure on challenges facing seabird rehabilitation centres, there were notable challenges commonly shared by all facilities. These are the '*lack of knowledge on post-release survival*' and the '*lack of government subsidy*' (Figure 32). On the '*lack of knowledge on post-release survival*', three of the five facilities has noted this as a challenge rating it a 5, the other remaining facilities rated this challenge a 3 and a 4. This means that it can be perceived that there is a challenge on the current state of knowledge once species have been released. Also, four facilities rated a 4 when asked whether the '*lack of government subsidy*' is a challenge. Although facilities had varying responses on the '*lack of money for facilities/supplies/staff*', this somehow coincide with the challenge on the '*lack of government subsidy*'. Two of the five facilities scored this challenge a 5, while the remaining three facilities rated a 4, 3 and 2 respectively. Therefore, there is somewhat consensus that there are monetary impediments in financing the rehabilitation processes. In Wimberger et al. (2010), the '*lack of money*' was listed as the main challenge in obtaining facility goals. Despite financial challenges, most facilities did not regard the '*lack of trained staff*' as a challenge, although it was a challenge for only one facility which they rated a 4. There were also varying responses by facilities when asked whether the '*lack of release habitat*' was a challenge. Two facilities noted this as a major challenge scoring it a 5, the other two facilities rated a 3 while the remaining facility only rated a 1.

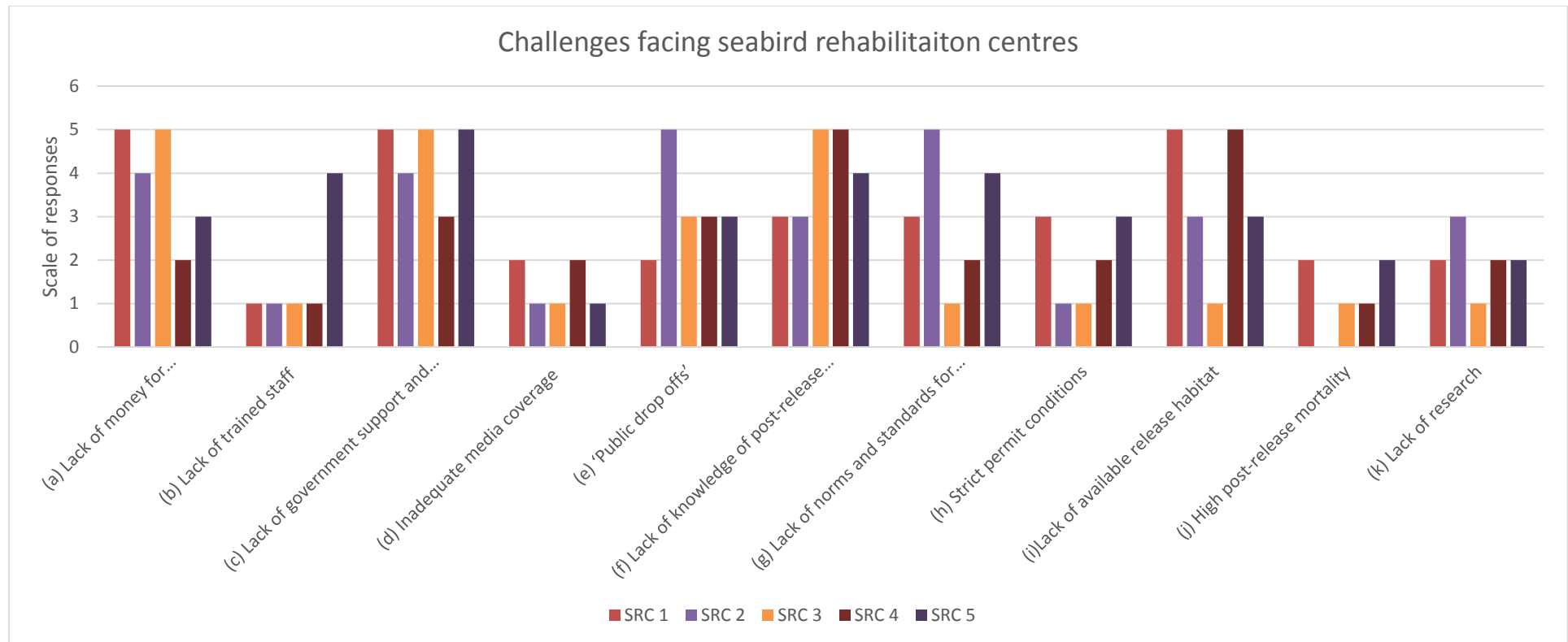


Figure 3: Operational challenges facing seabird rehabilitation centres (Minimal = 1; High = 5)

The Issuing and Enforcement of Permits

With regards to whether the issuing and the enforcement of permits are ‘*important and functioning correctly*’, there were mixed responses. These ranged from ‘*being efficient and functioning correctly*’ to ‘*being ineffective and not functioning properly*’. There was consensus on whether the issuance and the enforcement of permits are ‘*important but is not being enforced properly and that permit conditions are not strict enough*’. The same sentiments indicated by the participants of this study where echoed in the study conducted by Wimberger et al. (2010). This indicates that wildlife rehabilitators including seabird rehabilitation centres recognise the need for some stringent regulatory measures in their operations. This is reiterated in that permits, and the enforcement thereof, is useful and are not a hindrance to the rehabilitation processes.

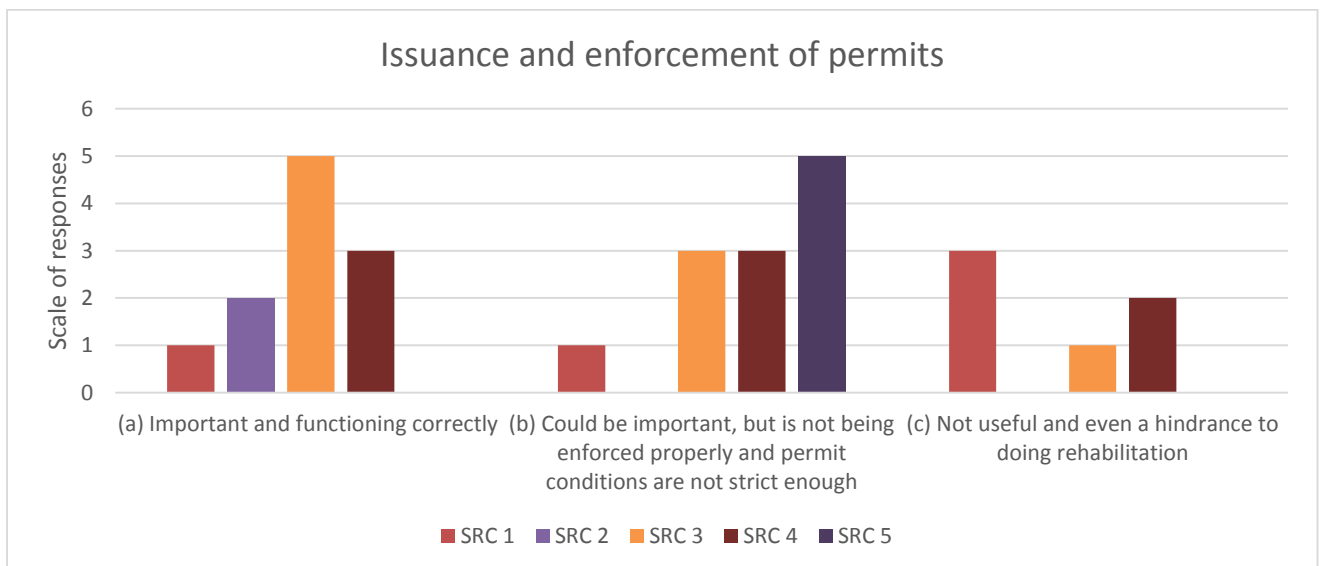


Figure 4: The significance of issuing permits and the enforcement thereof

Section B: Collection of Animals

Seabird rehabilitation centres have indicated that common seabirds that are brought into their facilities are African penguins, cormorants, gannets, gulls, terns and oystercatchers. They also indicated that most birds are received through various means such as from seabird colonies found along the coastline, from public drop-offs, residential areas, waste dumpsites and commercial areas. Some birds are brought in by members of the public. Two of the rehabilitation centres received 75 to 99 birds annually, and another two of the RCs received over 100 birds annually. Only one facility responded as receiving fewer than 25 seabirds annually.

Furthermore, seabird rehabilitation centres have indicated that seabirds are admitted to their facilities due to injury caused by fishing gear, oiling, orphaning or moult arresting. Moreover, other seabirds were also admitted for diseases such as malaria. All facilities mark each bird as it gets into the facility. One facility has indicated that birds that are received are noted on the association's database, where each bird has a unique number; however, due to the few that they receive, no markings are done, but large intakes are marked with temporary plastic rings or other techniques not injurious to birds. Not all facilities mark birds upon release. One facility has indicated that they would mark birds only until marking systems in the form of Passive Integrated Transponders (PITs) are received. From the responses, it seems each facility has a standard way of accepting seabirds. The common procedure followed by most facilities is that they accept and admit seabirds for rehabilitation, with the aim of eventually releasing them. Some rehabilitation centres transfer their seabirds to established seabird facilities due to various factors, including staff capacity. Also, facilities have indicated that the main reasons why seabirds are not released into the wild, other than euthanasia, are because of planned transfers to a sanctuary or a captive facility; or when birds are kept at the facility for educational or breeding purposes (Figure 5). These reasons resonated with those in the study by Wimberger et al. (2010).

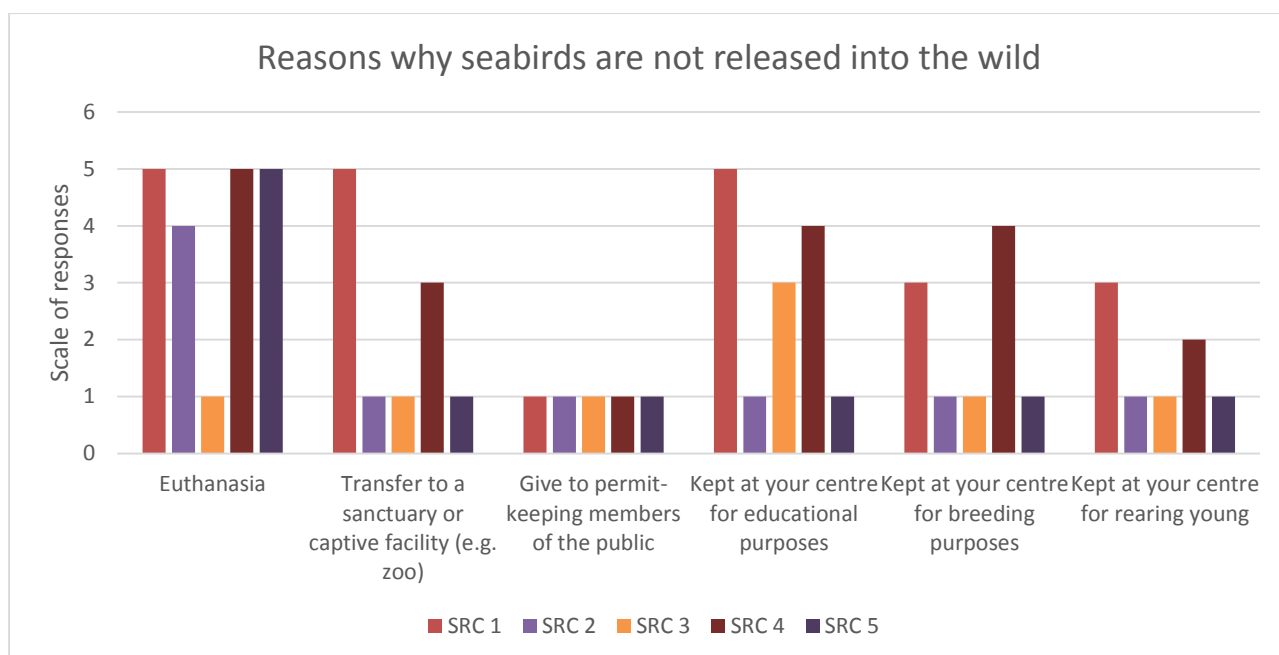


Figure 5: Reasons why seabirds are not released into the wild

Responses indicate that all seabird rehabilitation centres euthanise birds. A common reason for euthanasia is when an animal has non-repairable injuries. This seems to be a standard practice across all wildlife rehabilitation centres as 50% of the respondents in Wimberger et al. (2010) seem to follow this practice. One seabird rehabilitation facility, however, has indicated that euthanasia would be an option if the animal is in poor condition. Other than these two reasons, euthanasia did not seem to be an option that seabird rehabilitation centres would opt for, especially if the injuries sustained by the seabird are repairable. This is because euthanasia is seen as a final option in many seabird rehabilitation centres (Montesdeoca et al. 2017). One facility has indicated that the reasons that influence their decision to euthanise would be based on permit regulations. While only one facility has indicated that they have a euthanasia policy in place, all seabird rehabilitation centres have veterinarians at their facility, who conduct ongoing health/disease checks and make their own decision regarding whether an animal is to be euthanised or not.

Euthanasia

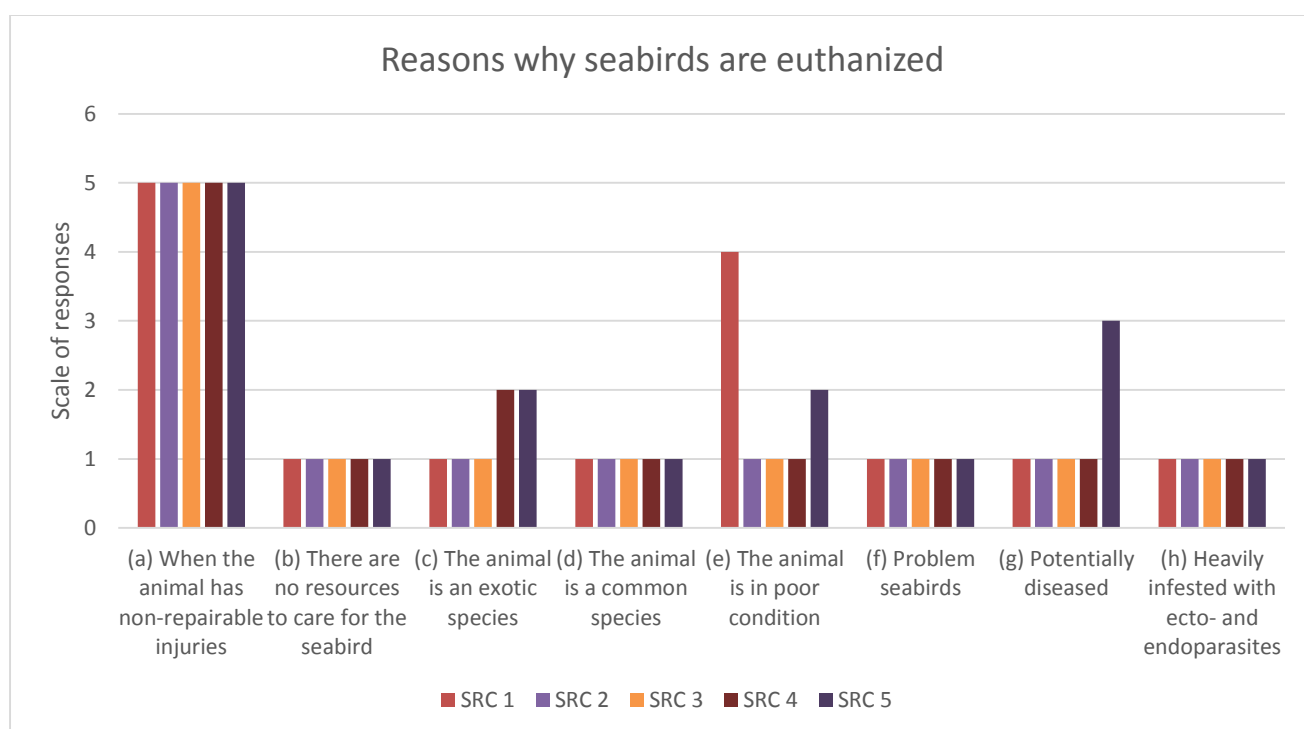


Figure 6: Reasons why seabird rehabilitation centres euthanize seabirds (Least common reason = 1; Most common reason = 5)

SECTION C – THE RELEASE

Different facilities release varying numbers of seabirds per year. This is indicative of the numbers of seabirds received, e.g. the two facilities that receive over 100 birds per year release about the same number of birds annually. The main species that are released are the African penguin, Cape gannet, and various species of gulls, cormorants as well as terns. These are the most common seabirds across the country's coastline and the most admitted into the rehabilitation facilities.

On the other hand, the most common reasons why birds are not released back into the wild are that a) it cannot walk or fly and b) it has one leg or wing (Figure 7). These reasons were the same in the study by Wimberger et al. (2010). The least common reasons why seabirds are not released include a) it is an exotic species b) it is blind/deaf as well as c) there is no suitable habitat for release.

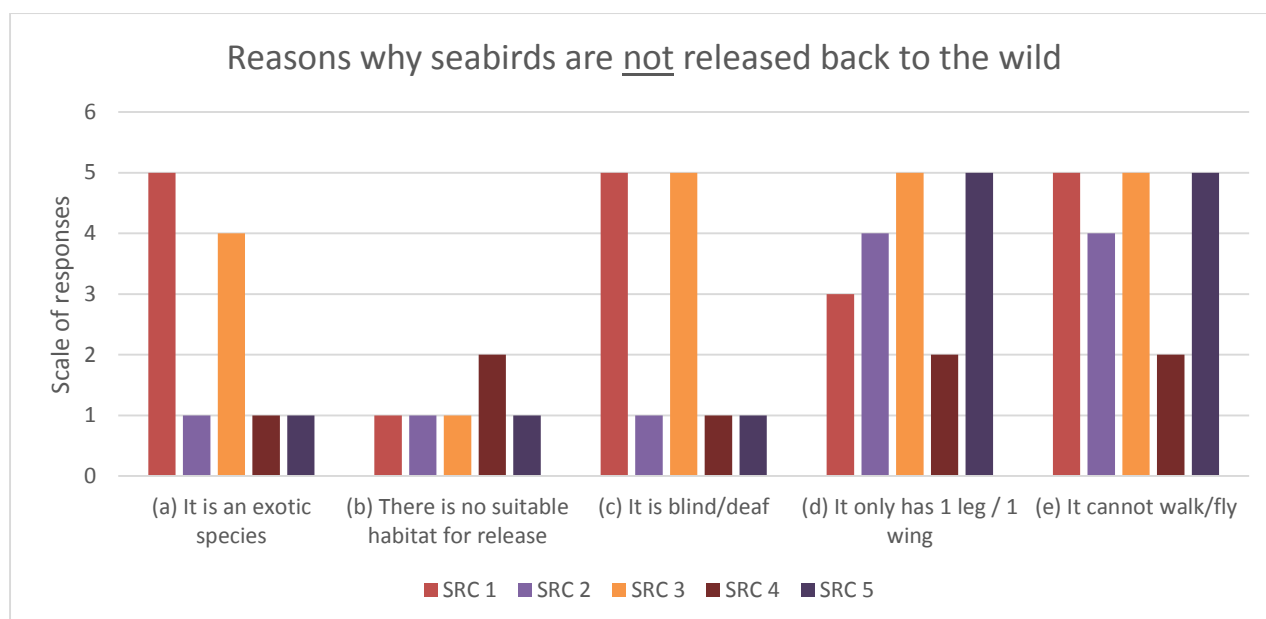


Figure 7: Reasons why seabirds are not released back to the wild (Least common reason = 1; Most common reason = 5)

Three seabird rehabilitation centres regarded on average 75% of their releases as being successful, while the two remaining facilities do not conduct post-release monitoring to quantify the success of their release. Factors contributing towards successful releases are regarded (Figure 8) as a) lessons learned from previous releases (this was rated 5 by all the facilities); b) suitable habitat; c) wild bred seabird; d) hard releases; e) age of an animal; f) good support from landowners; g) soft release (supplementary feeding and/or holding cage); h) age and sex structure of the group (Figure 8). There was no overall definitive factor that contributed to the successful releases. There were somewhat similar responses in Wimberger et al. (2010), however, suitable habitat was deemed as the factor resulting in successful releases. This may be because most of the wildlife rehabilitators who participated in the study admit mainly terrestrial species.

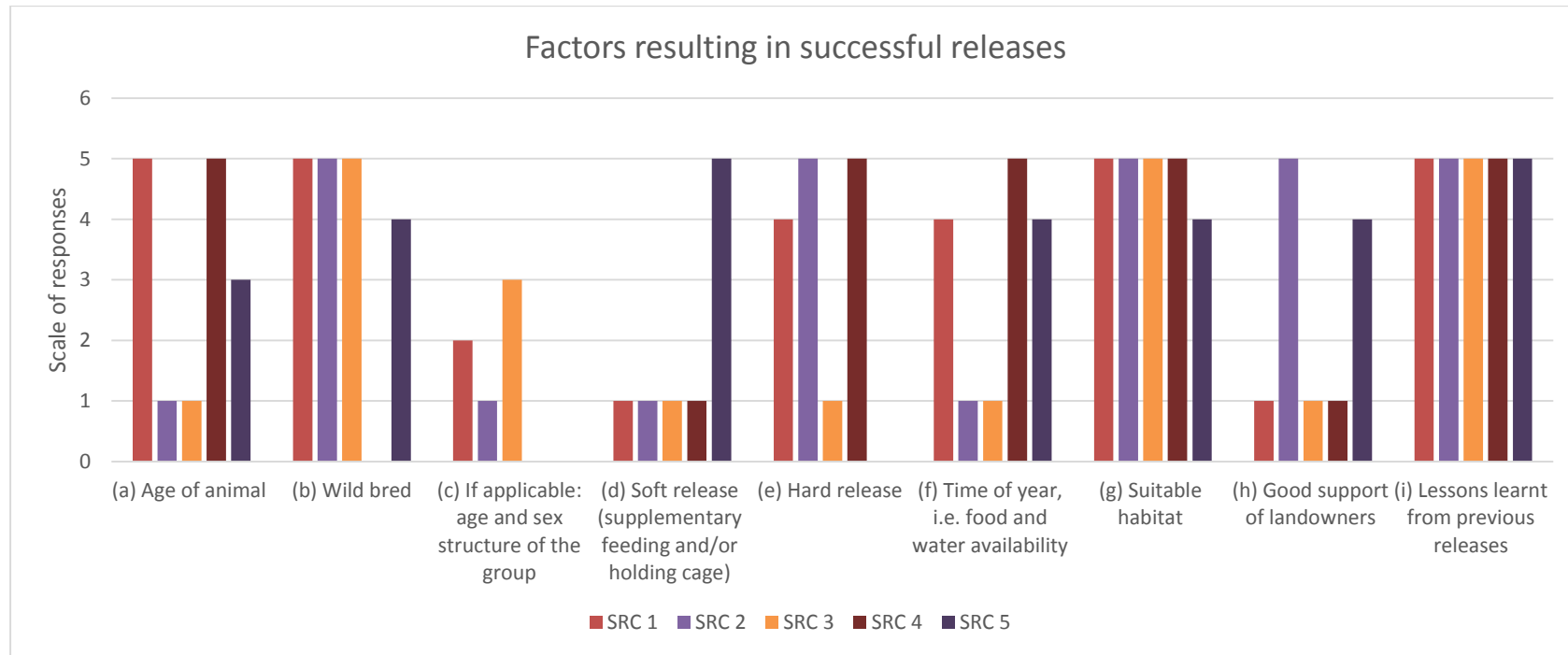


Figure 8: Factors resulting in successful releases (Low = 1; High = 5)

There were also no common factors among the various seabird rehabilitation centres when considering unsuccessful releases (Figure 9).

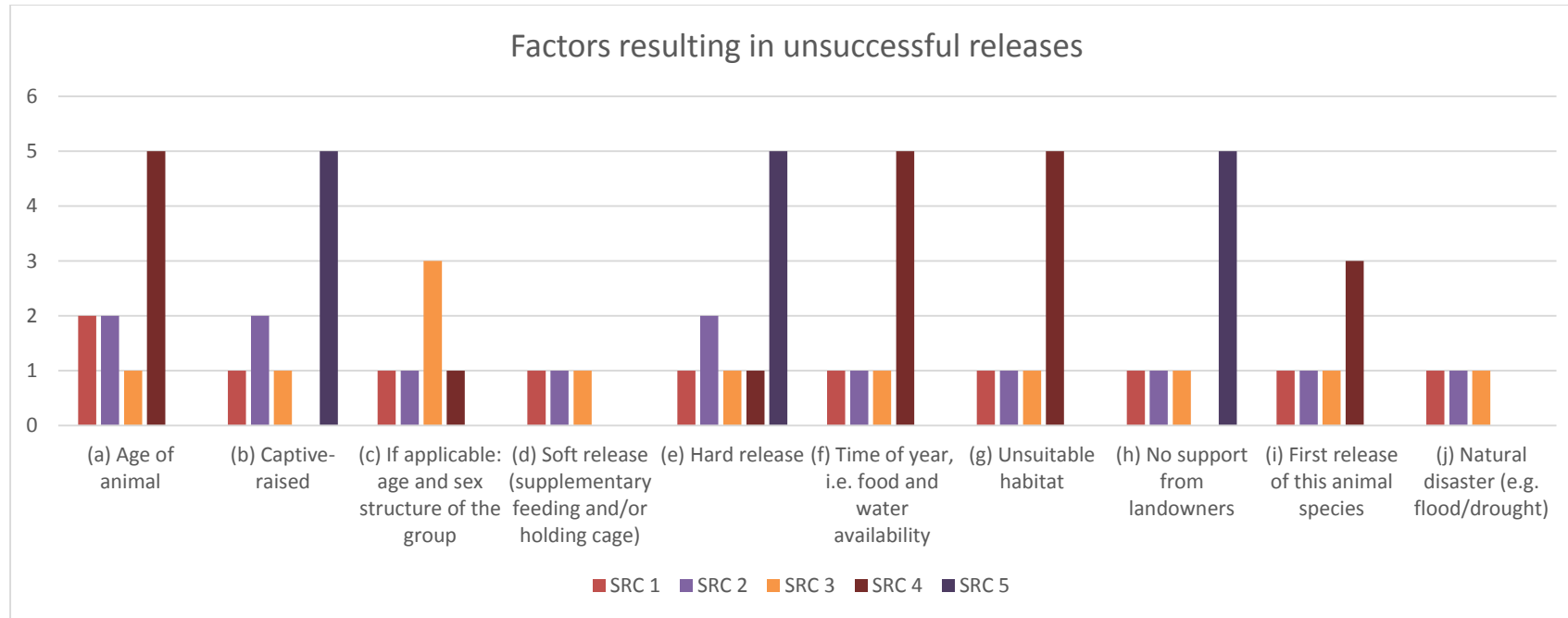


Figure 9: Factors resulting in unsuccessful releases (Low = 1; High = 5)

SECTION D: FINANCE

The majority of the annual operational funding comes from money generated by rehabilitation facilities. This was the same in comparison with the responses from Wimberger et al. (2010). There are some corporate sponsorships in some facilities. However, it was evident that the least funding comes from private donations, although except in one facility, where there is some private donor funding. Government subsidy (Figure 10) is lacking in all facilities. One facility seems to receive most of their funding from donations, i.e. public, private and corporate.

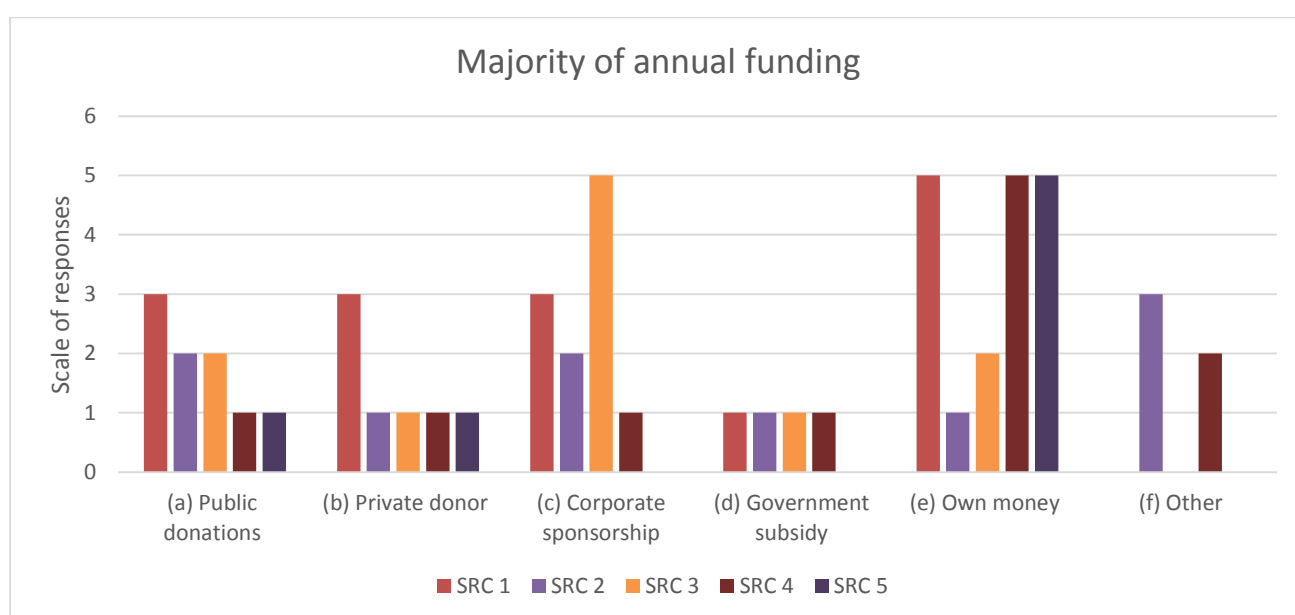


Figure 10: Monetary means on how seabird rehabilitation centres obtain the majority of funding (Minimal proportion = 1; Large Proportion = 5)

The majority of money generated by seabird rehabilitation centres is spent on staff salaries, food and shelter for animals as well as veterinary procedures (Figure 11). Equipment and release of animals also contribute to the facilities' expenditure. Post-release monitoring and post-release support are minimal expenditures, indicating that facilities have other pressing commitments that supersede post-release monitoring and support. The responses in Wimberger et al. (2010) indicated that the majority of costs went towards post-release support (food/shelter) as well as the release of animals-transport. It is also to be noted that this is likely where these facilities would spend the money when a large donation is made.

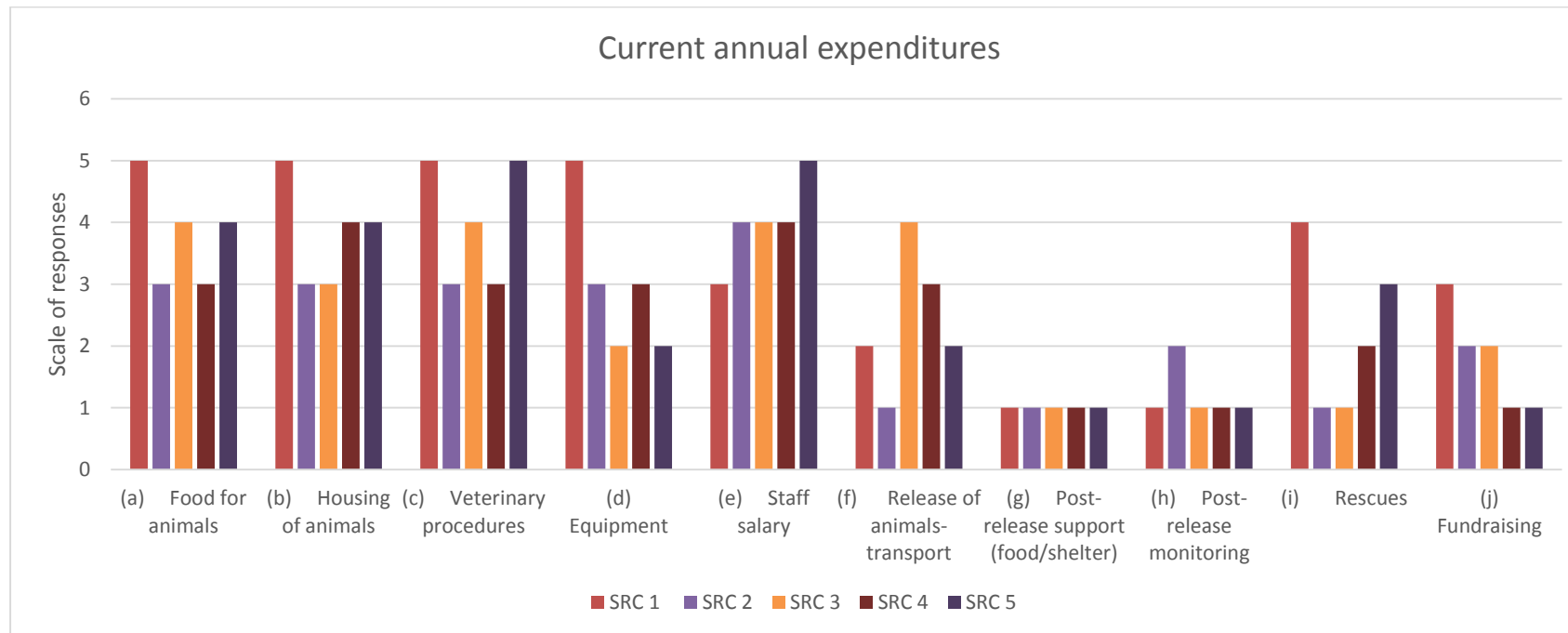


Figure 11: Annual expenditures generated by the seabird rehabilitation centres

SECTION E: LEGISLATIVE REQUIREMENTS

The survey revealed that there were a range of views regarding whether the integrated permit process is effective (Figure 12). Facilities require several permits to operate, apart from those under the Threatened or Protected Species Regulations. These include the Marine Living Resources Act, if facilities would like to conduct research; Seabirds and Seals Protection Act for keeping seabirds; as well as provincial permits under provincial ordinances and those issued by municipalities under the various municipal by-laws. Three facilities indicated that the multiple permitting processes required is tiresome. This is contrary to two facilities which did not mind the laborious processes of multiple permits. The quality of permit conditions was deemed to be somewhat satisfactory. Furthermore, two facilities deemed the quality of inspections; the knowledge of officials regarding facilities; auditing of facilities as well as the reporting and facility-specific challenges by regulators were poor. This is contrary to one facility which rated all these aspects to be excellent. Two other facilities did not respond to these questions. The facilities indicated that the permit conditions are relatively stringent; however, the quality of inspection is very poor. The lack of enforcement was also seen as the reason why some of the rehabilitation centres would operate without renewing their permit.

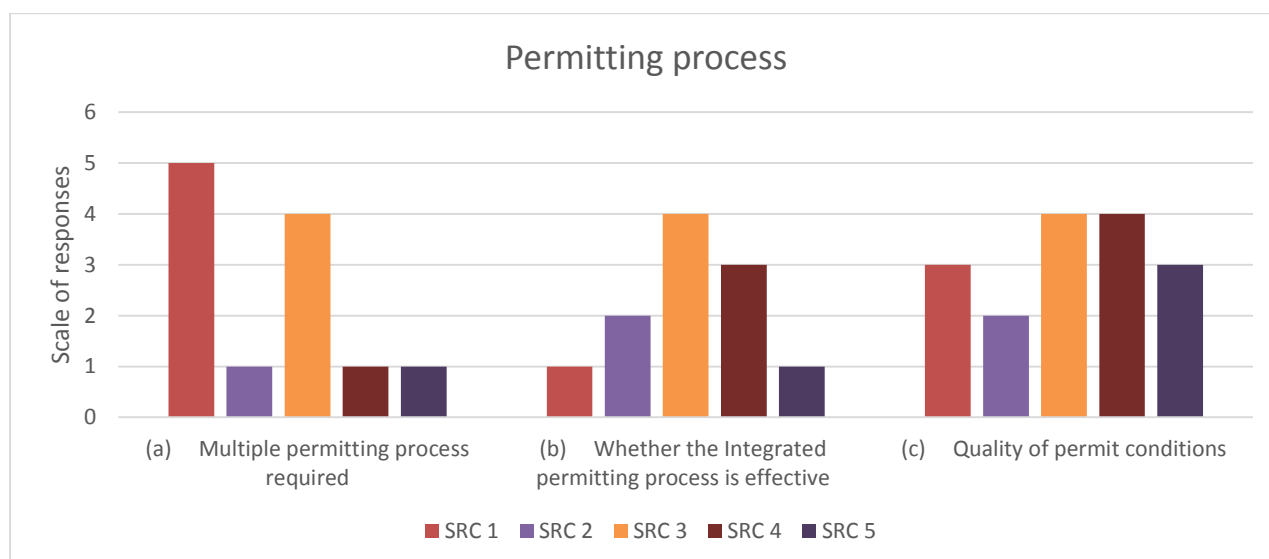


Figure 12: Impediments to permit processes affecting seabird rehabilitation

When coming to facility inspections by regulatory authorities, it was evident that the knowledge of officials regarding the operation of the facilities was minimal. It was indicated that hardly quality site inspections by regulators was conducted. One facility indicated that there were no known inspections conducted at their facility. Also, the auditing of facilities was rated low. This rating is equivalent to the reporting on facility-specific challenges by regulators and the quality of inspections.

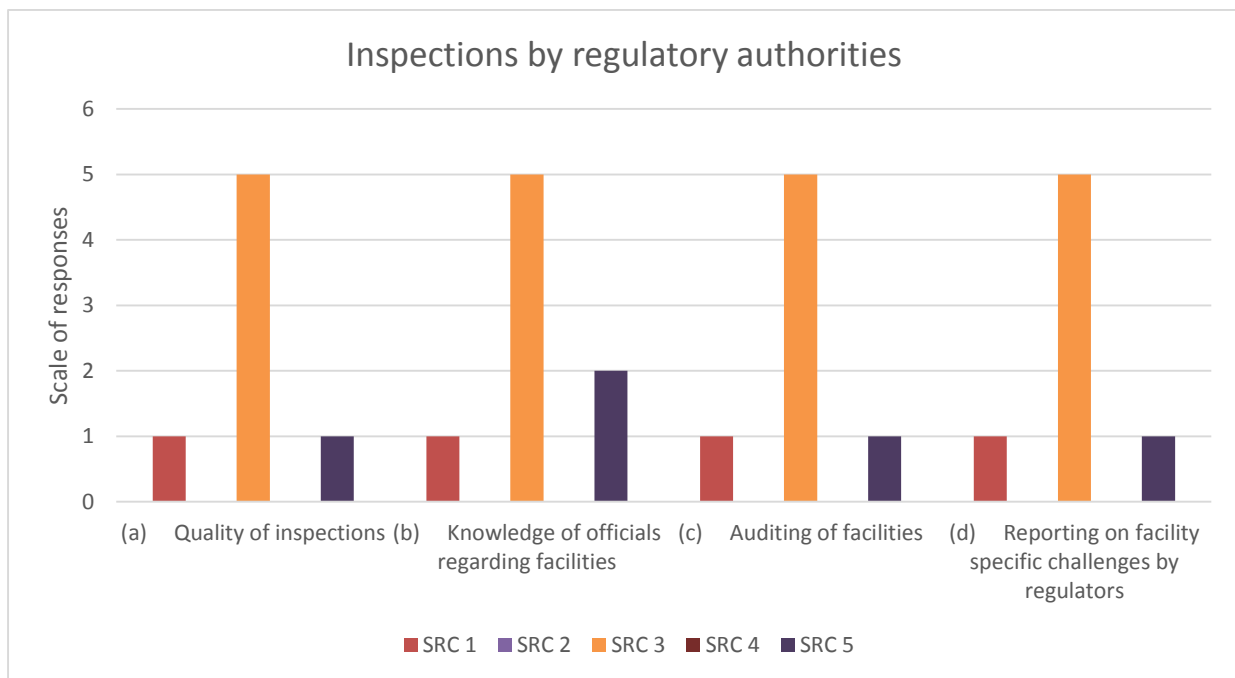


Figure 13: Inspections by regulatory authorities

Only one facility rated the inspections by regulatory authorities a 5. Most of the remaining facilities have rated the current efforts by regulatory authorities a 1. Furthermore, some facilities expressed their concerns regarding the current legislation pertaining to the management of seabirds in rehabilitation centres in that it is almost “non-existent” and “very confusing as it is unclear who the regulatory body responsible for issuing permits is”. They have also provided their recommendations of how there can be improvements in the quality of care for seabird rehabilitation centres. These recommendations are:

- Regulators need to ensure that aspiring ‘rehabbers’ first pass a ‘rehabbers exam’ or prove that they have extensive rehabilitation experience relevant to the species that they are rehabilitating. Rehabilitation centre applicants need to

demonstrate that they have extensive experience or acquire practical rehabilitation experience and training from an already accredited facility (pass a 'rehab examination' and get accredited) before they are permitted to run a seabird rehabilitation facility.

- More help and advice in minimising delays in issuing permits.
- Provide legislated norms and standards. There needs to be suitable consequences when there is non-adherence to the norms and standards.
- Train auditors for inspections and conduct regular inspections at seabird rehabilitation centres.

CHAPTER 6: ETHICAL CONSIDERATION OF SEABIRDS IN REHABILITATION

Biodiversity is a collection of various species (Neumann, 2004). Species such as seabirds possess intrinsic value. It is our duty to protect them. O'Neil (1997) reasoned that it is the nature of humans to protect things that possess intrinsic value. As such, seabird rehabilitation centres were established by the birds' need to be protected. Seabirds are kept in captivity for various reasons, such as when they are sick, injured or abandoned. Some seabirds that cannot be rehabilitated back to the wild, serve other purposes, such as education and research (Waples and Stagoll, 1997). The animal liberation movement is a popular movement that has emerged in the 20th century aimed considering animal rights and anti-speciesism (Benthall, 2007). The movement aimed to transform people's mindset about animals and their treatment (Waples and Stagoll, 1997). This popular movement emerged on the heels of the fight against racial segregation when industrialisation started to have a destructive effect on the environment, subsequently affecting humans (Van Der Veer & Pierce, 2003). The animal movement also emerged once the social movement had undergone a cultural change, through the acquisition of material wealth. The cultural shift, both in welfare and economy, allowed for a change in attention to promote non-material goals; such as security for a better quality of life through a healthier environment (Connelly et al. 2012). One of the efforts directed towards creating a better life was the scrutiny placed on the treatment of animals while in captivity (Waples and Stagoll, 1997). This scrutiny has led to questions about the ethics of animal treatment which gathered scientific and public interest. The nature conservation movement in the United Kingdom began as a concern mainly by middle-class citizens, observing the rapid decline of species and their extinction associated with urban sprawl (Karesh, 1995). In the United States, species loss and extinction were mainly associated with the loss of wild spaces due to industrial development (Connelly et al. 2012; Miteva et al. 2012; Karesh, 1995). In the 1990s, South Africa's pursuit of environmental justice followed the path laid by the United States and the United Kingdom, which also coincided with the changing socio-political movement (Khan, 2002). The moral philosophy of environmental justice requires a broader view of how matters pertaining to the environment ought to be dealt with (Van Der Veer & Pierce, 2003) given the information that has been

revealed by science on the impact of human activities inflicting negatively on ecological processes that sustain life on earth. These include depletion of the ozone layer; pollution and exploitation of water resources; loss of soil productivity; rapid destruction of the tropical forests, oceans as well as coastal areas. These changes have resulted in the rapid extinction of habitats; and thus the dysfunction of ecosystem structure and composition; and subsequently the irreversible loss of species (Van Der Veer & Pierce, 2003).

The animal liberation movement requires an “expansion of our moral horizon” as well as a “change in our attitudes to nonhumans”. This further requires an “extension of principles of liberty, equality and fraternity over the lives of nonhumans” (Van Der Veer & Pierce, 2003). Jeremy Bentham expressed the principle of equality through a formula he developed which states “*Each to count for one and none for more than one*”. If we, as humans, truly care about the interest of non-humans, in this case seabirds, we would elevate their interest to an equal place as we do our own, irrespective of the characteristics they possess (Van Der Veer & Pierce, 2003; Lunney, 2012). Therefore, if non-humans suffer, there can be no moral justification for denying the suffering and not treating it like our suffering. This is despite the fact that higher species such as mammals and birds, including seabirds, display external signs that indicate to us that they too suffer pain. These external signs by higher animals display behavioural signs like writhing, yelping, calls and others in attempts to avoid the source of pain (Van Der Veer & Pierce, 2003). We feel entitled and tend to treat members of other species in a way different from how we would treat our own. This is known as “speciesism”. The term speciesism is most apparent in the practice of experimenting on nonhumans for the benefit of humans. This highlights the issue regarding the keeping of seabirds in captivity; do rehabilitation centres have a right to capture, hold and keep seabirds in captivity in the first place? Whether be it for temporary care and supposedly for *their* well-being? Moreover, does the speciesism apply to the marking of seabirds, once they have been rehabilitated and released back into the wild? Tom Regan, an animal rights activist, is against any use of animals in science; agriculture as well as in commercial and sport hunting and trapping (Van Der Veer & Pierce, 2003). His moral philosophy is that the system allows us to view animals as a resource which can either be eaten, “surgically manipulate” or be utilised for sport and money. Although the scenario of

holding seabirds in captivity and marking birds for post-monitoring purposes only applies to one of his objections, the premise upon which the rehabilitation of seabirds takes place firmly agrees with most of his “other” views. It is observed that seabirds undergoing rehabilitation are not used as “lab rats” but merely to address matters of human-wildlife conflict. This point may be seen otherwise, and despite any attempt to formulate an adequate theoretical basis, it will always fall short of a definitive answer.

Birds have extrinsic and intrinsic value for humans. Some of the benefits can have a direct benefit for humans through the ecosystem benefit they provide humans (Whelan et al. 2008). There is a belief that some nonhumans have a moral standing and are of more value than others which is not only inclusive of their instrumental value to humans (Everett, 2001; Van Der Veer & Pierce, 2003). However, if moral consideration is extended to seabirds, does this then mean that we are allowed to experiment on them, confine them to captivity as well as enable them to face numerous anthropogenic activities that impact on their population which in turn threatens them with extinction? (Everett, 2001). Although I understand the stance of Regan with regards to using animals for scientific purposes, I tend to lean more towards the moral philosophy of Peter Singer who focuses on the grounds of believing that birds and mammals suffering is closely analogous to the grounds we have for believing that other humans suffer as well. Peter Singer claims that *“If a being suffers there can be no moral justification for refusing to take that suffering into consideration. No matter what the nature of the being, the principle of equality requires that its suffering be counted equally with the like suffering – in so far as rough comparisons can be made – of any other being”*. Therefore the existence of seabird rehabilitation centres, is an extension of the moral consideration to seabirds because of behavioural signs that are similar to those of humans that indicate that they do indeed suffer. It is also a belief that I possess, in that, it makes more moral sense that few animals are risked and experimented upon for research that will provide more understanding of their behaviour and will aid in conservation; than to risk no individual seabirds at all and see species go extinct. The experimentation on seabirds is mainly to collect data on the state of the bird as well as to ensure that the quality of care in the rehabilitation contributes to the survival of the species post-release. There is a minimal gain for these institutions other than gain better understanding in the species they are caring for. These institutions also release

seabirds, whether they be abandoned chicks that have been hand-raised, or oiled and/or injured rehabilitated seabirds; therefore, understanding that their aim is not intended to hold these species in permanent captivity, but to release them back into the wild for them to continue contributing to the breeding success of the species. If birds cannot for some reason be released back into the wild, the consideration of the decision needs to have been a well thought out process ensuring that the welfare of the bird in captivity is of high quality and guaranteeing that the environment to which they are accustomed is well emulated at the facility. Other secondary factors of the importance of holding birds in captivity will now come into consideration. These, among others, include the preservation of endangered species from habitat degradation and starvation (such as limited fish resources); learning about the biology and behaviour of the species in captivity; as well as education and awareness of the impacts of anthropogenic activities.

The objectives of captive institutions throughout the world are to strengthen in-situ conservation with the aim of improving and increasing the captive breeding population, quality of care for species, public education and awareness (Agoramoorthy & Harrison, 2002). The answer to the question on whether rehabilitation centres have a right to capture, hold and keep animals in captivity in the first place, whether be it for temporary care and ultimately for their well-being lies with each and every person and their moral philosophy, regarding the issues of animal rights. In this case, the belief is that the humans' knowledge of seabirds has evolved over the years; which warrants their capture if they are seen in distress or are suffering. Therefore, to indicate that the action of capturing, keeping and holding seabirds in temporary or permanent captivity, is in the best interests of the species may not be unequivocally clear. It is merely aimed at ensuring that their suffering is minimised. The ability of humans to make sure that seabirds do not suffer, does not solely lie in a causal reason to a painless death (as it may be the case when euthanasia is an option), but, that it is in the interest of the species not to die. Humans, as moral agents, have a presumptive duty not to engage in certain activities that may lead to the suffering and a death of an animal. Therefore, the burden of suffering of animals would have to be justified on the grounds of the same moral weight as those to justify those of humans (Van Der Veer & Pierce, 2003). It is without doubt that there are disadvantages to keeping seabirds in captivity, such as

animals in captivity can suffer from stress-related factors, boredom and so forth as well as lose intergenerational bonds that would have been acquired when in the wild.

It is for this reason that humans need to adequately address the welfare of seabirds in an attempt to extend moral consideration to them (Everett, 2001). Animal well-being and animal stress are concepts that need to be taken into account in captive institutions for wildlife. By extending a moral consideration to seabirds, there is also a more human ethic experienced by humans, which in turn extends to an environmental ethic, therefore, expanding animal welfarism more broadly to address environmental destruction. The moral consideration of seabirds needs to extend to areas and resources that are instrumentally valuable to both seabirds and humans as well (Everett, 2001). Historically, humans have fallen short in relating to non-humans. This is not only through the impact of anthropogenic activities on wildlife, but also through the ignorance of conservation efforts such as research and management interventions. The focus of animals including seabirds that have some instrumental value for humans, whether it be in research, or as companionship, entertainment and food, has been somewhat limited, with humans failing to understand a wider perspective associated with wildlife (Lunney, 2012).

Some of the challenges of taking into account the welfare of seabirds are that it is not seen as being “environmental enough”. It aims to eliminate natural processes such as predation, which cause pain and suffering, which is an intricate part of the survival of seabirds (Everett, 2001; Brossy et al. 1999). This means, for example, if African penguin chicks are most vulnerable when abandoned by their parents (Kane, 2010), shouldn't we let nature ‘take its course’ and appreciate the natural processes? Is predation seen as a part of a natural process which imparts agony, pain and suffering? Why is predation to a large degree not morally acceptable in the welfare of species? (Everett, 2001). It is not in the best interests of adult penguins to abandon their chicks, but may be in their interest that they abandon these chicks and let them suffer, for a balance of the desired outcome (in some cases unbeknown to humans) (Van Der Veer & Pierce, 2003). This further emphasises that in most cases, humans have limited ‘lenses’ through which they view and understand a holistic environment which a species inhabits (Lunney, 2012). This may be a challenging problem to assess, taking into account that the decline of seabirds has mainly been attributed to

anthropogenic activities; and therefore, to allow these seabirds to be further impacted by heavy predation driving their populations further towards extinction, surely is a moral obligation that we need to consider. It does not, however, exclude predation of seabirds all together, but it tolerates reasonable levels of predation, allowing for populations to recover to acceptable levels once the seabird has been released. The consequentialist approach implies that it is a moral obligation for humans to protect prey from the consequences of predators (Everett, 2001). Furthermore, predator consequence also needs to be assessed, to ensure that unintended consequences from the predators are minimised. This moral extension, should then, also be extended to fish as a preferred prey of seabirds, particularly in the light of the decline and over-exploitation of fish species, as they form an integral part of the survival of seabirds. Tom Regan's theory rejected the consequentialist approach to the morality of human interaction with non-humans. Regan writes "Just as our negative duty not to interfere in the lives of others does not consist merely in minding our own business, so our duty regarding the respectful treatment of animals involves more than our taking care to treat them with respect. Since they have a valid claim to respectful treatment, we have a *prima facie* duty to assist them when others treat them in ways that violate their rights"(Regan, 1983).

It is clear that seabirds have endured anthropogenic threats for over 250 years which led to their threatened status, not only in South Africa but throughout the globe (Trathan et al. 2015; Maree et al. 2014). They have been of instrumental value to humans through their products (such as eggs, guano, feather, food and oil) but also through their ability to provide valuable information in response to ecological changes in the marine environment (Mallory et al. 2010; Trathan et al. 2015; Einoder, 2009). We then, as humans, need to evaluate our actions which lead to the decline of these species; but also our interventions, through which we attempt to rescue them from possible extinction.

To conclude, the expansion of moral consideration of seabirds, should not be at the expense of other indigenous fauna and it is therefore imperative to note that the focus of this study on seabirds, does not in any way suggest that the inherent worth of these species is superior to those of other non-humans (Lunney, 2012). The need to understand their behaviour and biology through scientific research is an important

aspect of their conservation, which can be effected in seabird colonies, the marine environment, as well as when they are admitted to rehabilitation centres.

CHAPTER 7: DISCUSSIONS & CONCLUSION

This chapter is devoted to providing a critical discussion of the findings of the analysis when matched against the literature discussed in chapter two. Key findings from the study are as follows:

- a) Seabird rehabilitation centres contribute to seabird conservation. They achieve this by helping injured or orphaned seabirds that are unable to sustain themselves before releasing them back into the wild.
- b) Seabird rehabilitation centres generate own finances to provide necessary care for seabirds. The majority of generated funds go towards food for animals, the housing of animals, the veterinary procedure as well as staff salary.
- c) There is an overall unfavourable perception of government regulators by seabird rehabilitation centres. This includes the quality of inspections, knowledge of officials regarding facilities, the auditing of facilities as well as the reporting on facility-specific challenges by regulators.

As demonstrated in the literature review, there is solid evidence that seabird rehabilitation has adapted to help improve the declining population of seabirds. Scholars such as Fraser and Moss (1985); Karesh (1995); Nijman (2006) and others have demonstrated that seabird rehabilitation can take many forms that can assist in improving seabird populations. This is further confirmed in the questionnaire which indicated that seabird rehabilitation centres not only 'care and help injured/orphaned seabirds with the aim of releasing them back into the wild', they also 'provide education about seabirds with the aim of increasing compassion' as well as contribute to 'seabird conservation'. This provides strong support and linkages between seabird rehabilitation centres and seabird conservation. The definition of conservation is in itself varied among people (Sandbrook, 2015). For this discussion, we shall use the definition by Leader-Williams et al. (2011) which states that conservation encompasses 'actions that directly enhance the chances of habitats and species persisting in the wild.' As such, the aim of the seabird rehabilitation centres is appropriate. This suggests that the actions of seabird rehabilitation centres 'directly enhance the chances' of seabirds to persist in the wild.

The establishment of seabird rehabilitation centres has been necessary due to the negative impact of human activities (Hutchins, 2003; Butchart et al. 2004; Baur, 2011; Miteva et al. 2012; Trathan et al. 2015). Concern for the welfare of seabirds led to modern society initiating seabird rehabilitation centres (Underhill et al. 1999; Wolfaardt et al. 2009). However, the establishment of seabird rehabilitation centres, although, meant for the good of the species, have seen some challenges. Some facilities have indicated that the fragmentation of legislation regarding seabirds and seabird rehabilitation centres is very confusing; and there seems to be a duplication of responsibilities among the various spheres of government, namely the national and provincial departments. This is an aspect that has been previously raised in the African Penguin Biodiversity Management Plan (RSA, 2013) and Rossouw and Wiseman (2004) as well as Lund-Thomsen (2005) who noted that duplication in some of the concurrent functions between the spheres of government was imminent. The Department of Environmental Affairs' efforts in revising the Threatened or Protected Species Regulations and Species List is a step towards improving the current legislation, resolving this confusion.

Over the years, seabird rehabilitation centres have become specialist facilities as most of them admit numerous seabirds annually (Wimberger et al. 2010). Seabird rehabilitation, like other wildlife rehabilitation, is an acquired skill and requires some level of competence to rehabilitate wildlife (Johnson, 2012). The government needs to ensure that there are some forms of regulatory measures in place for seabird rehabilitation; and that not only competent and skilled individuals are permitted but also that the unlawful possession of wildlife which flouts existing legal and policy frameworks are dealt with. Over the years, the value of wildlife, including seabirds, has increased as more wildlife populations decline (Casey and Casey, 1994).

Regulations and policies on seabird rehabilitation need to ensure that only skilled rehabilitators who contribute to the conservation of seabirds are permitted (Johnson, 2012). The current environmental legislation in South Africa requires a minimalist approach in demonstrating some level of competence for seabird rehabilitation. This includes the Threatened or Protected Marine Species Regulations. Furthermore, NEM:BA does not outline the standard for the quality of care in seabird rehabilitation centres, nor does it provide a measure which seabird rehabilitation centres are

required to uphold in the care of seabirds. Therefore, the lack of experience by regulators as well as lack of norms and standards make it difficult for the Department of Environmental Affairs to fully assess the impact of seabird rehabilitation, as well as to screen-out undeserving applicants before awarding them with permits. This is confirmed by the survey results.

Adding to the predicament, the National Environmental Management: Biodiversity Act (No. 10 of 2004) does not address matters of welfare (Adv. N. de Kock 2016, personal communication, 4 June). To properly regulate rehabilitation centres and to ensure the quality of care for the declining seabird species, welfare is an integral part of these facilities. The exclusion of welfare in the National Environmental Management: Biodiversity Act (No. 10 of 2004) creates a predicament for the Department when prescribing measures for the care of seabirds. Rehabilitation protocols in Spain, for example, have resulted in a better clinical recovery for wildlife as well as the welfare of species (Molina-López et al. 2015). The identification of indicators can help establish the necessary protocols for diagnostic techniques as well as treatment (Molina-López et al. 2015).

The rationalisation of the fragmented legislation was partly fulfilled through the gazetting of the Threatened or Protected Marine Species in May 2017. Moreover, there are provisions within NEM:BA such as Section 9 that allows the Minister to gazette Norms and Standards (N&S) for restriction of activities which may impact on biodiversity and its components. It also requires that indicators to measure compliance be set (RSA, 2004). This can be used to draft the Norms and Standards for Seabirds in Rehabilitation which can provide much-needed guidelines. Also, from the feedback received from the questionnaires, seabird rehabilitation facilities are more than willing to assist the government in streamlining processes that would make it easier for them to comply. The process to develop the Norms and Standards of Seabird Rehabilitation would need extensive stakeholder participation since Wimberger et al. (2010) has indicated that there is a lack of communication between rehabilitators. The government needs to identify numerous agencies that are currently contributing to seabird conservation and to provide the necessary support to ensure an equitable participation of affected and interested parties in seabird conservation and the management of seabird rehabilitation centres.

The lack of auditing of seabird rehabilitation centres by regulators has been highlighted as a concern by the seabird rehabilitation centres. Despite the lack of experience by regulators, the Threatened or Protected Species Regulations gazetted in 2007 had limited marine species listed, specifically seabirds. The African Penguin (*Spheniscus demersus*), was the only seabird species listed in the TOPS list. Other seabird species were regulated under the Seabirds and Seals Protection Act. This made the compliance and enforcement for these other seabirds very difficult. The Environmental Management Inspectorate (EMI), affectionately known as the “Green Scorpion”, were not mandated to enforce the Seabirds and Seals Protection Act (No. 46 of 1973) (RSA, 1973) under which the majority of seabirds were listed. This is because the EMIs are appointed in accordance with section 31 of the National Environmental Management Act (107 of 1998) (RSA, 1998b); therefore, they can only enforce NEMA and its SEMAs. The Seabird and Seals Protection Act fell outside the ambit of NEMA and could therefore not be enforced under the provisions set out in NEMA. If the Norms and Standards for seabirds in rehabilitation can be developed, they can be enforced by the EMIs.

In addition to the above, Wimberger et al. (2010) indicated that another main challenge undermining compliance inspections at facilities is the overall lack of staff capacity within the government. It is possible that government is unable to measure compliance within the facilities to which they are currently issuing permits. Duplication among the spheres of government needs to be corrected to aid in the much-needed human capacity of an already constrained resource. Despite this challenge, the government needs to regulate this activity more. Although there is some consideration taken by regulators before awarding these facilities with permits, some facilities question that the level of skills of rehabilitators is not interrogated by regulators. This is because the level of knowledge on seabird rehabilitation by officials issuing permits is limited; this is evident in the general permit conditions accompanying permits that do not address facility specific concerns (Wimberger et al. 2010). Since capacity is an issue within government, the Department of Environmental Affairs needs to consider partnering with organisations such as the South African Veterinary Council (SAVC) for collective and effective decision-making process regarding the quality of care of seabirds in these facilities. Furthermore, a Wildlife Rehabilitation Centre Committee should be established for the necessary

stakeholders to draft the Norms and Standards. Seabird rehabilitation centres need to be guided by the adherence to Norms and Standards, code of ethics, rehabilitation/release targets and monitoring (Wimberger et al. 2010).

There seems to be minimal training for officials to assess the quality of care in rehabilitation facilities, making the drafting of permit conditions and the compliance and enforcement of the conditions difficult. Inspections that are lacking could be assisted by a general assessment of the facility which can then be used to either grant or deny a permit to the rehabilitation facility. The amendments to the 2017 TOPS Regulations bring some relief, as there are more compulsory permit conditions included in the regulations; however, it does not detract from officials requiring experience to assess these facilities.

One of the recommendations from the survey was that a more rigorous process is required in order for facilities to acquire operational permits. Seabird rehabilitators need to be assessed regarding their competency in seabird rehabilitation. The use of a written examination to assess competency should be a prerequisite for obtaining a seabird rehabilitation permit; successful applicants should score above 80%. This needs to incorporate international standards, as well as identified needs within the country, to ensure that the conservation goal of restoring seabird populations to a reasonable percentage is achieved. Also, a prescribed minimum number of practical hours, required to demonstrate sufficient experience, needs to be determined. Applications should also include the date and the location where experience was acquired, as well as a minimum of two referees. The experience must be acquired through an apprenticeship at a registered and regularly audited facility. The curriculum for an apprenticeship needs to be approved by the relevant department and reviewed every five years (Casey and Casey, 1996).

In addition to the requirements for rehabilitators, the same courtesy needs to be extended to departmental officials who are responsible for issuing permits and those responsible for compliance inspections at seabird rehabilitation centres. This would ensure that policymakers are equipped and have relevant experience in drafting legislation that addresses problems on the ground. Furthermore, the government should contract auditors to oversee the progress made by the trainee and the facility.

This ensures that future rehabilitators and government officials are adequately prepared and skilled in this area. Seabird rehabilitators would need to produce proof of a relationship with an established veterinarian who is experienced in the field of seabird rehabilitation. Facilities or individuals that are not adhering to the requirements as set out or violators of permit conditions need to be dealt with expeditiously (Casey and Casey, 1996).

An MOU should be developed, with recognised associations and organisations, to assist in the training of departmental staff to ensure that they are familiar with the operations of seabird rehabilitation. Chapter 6 of the 2017 TOPS Regulations allow for the recognition of any association or organisation, representing persons or facilities in the utilisation of listed threatened or protected marine species, to be considered for any dispensation in terms of NEM:BA. This provision in the regulation can assist the Department in controlling its facilities without stretching the already strained departmental human capacity. The recognition by associations or organisations may bring necessary skills like auditors from external auditing firms that are trained and highly experienced. These associations or organisations can assist in:

- The development of Standards of Operation and Accreditation procedures for seabird rehabilitation centres. These can be drafted by both the department and the organisations/associations.
- Regular audits (in accordance to the Environmental Management Systems (EMS) conducted of all seabird rehabilitation centres;
- The compliance and monitoring of all facilities;
- The implementation of recommendations from the audits being realised within a reasonable timeframe;
- Regular feedback provided to the Department.

Furthermore, the use of association and organisations can provide the training necessary for Department officials; through a formalised training process as well as a practical process. Annually, associations and organisations may be required to provide reports to the department that will provide information to the permitting process as well as the compliance of facilities.

The survey results indicated that rehabilitation centres generate their own funding and do not receive a government subsidy. This was also found by a study conducted by Wimberger et al. (2010). Cheyne (2009) indicated that one of the measures of success of rehabilitation facilities lies in their ability to self-sustain. In the 1950's, wildlife rehabilitation used to be the function of government. It has since withdrawn its support and subsidy resulting in the burden being on conservation agencies and Non-Profit Organisations (NPO's). The lack of steady support for these organisations may have inadvertent consequences for the rehabilitation of seabirds, such as lack of supplies necessary for the treatment for seabirds undergoing rehabilitation; and the lack of trained staff for the facility which may impact on the welfare and the quality of care for species. The survey indicated that this aspect is where most of the funding acquired by rehabilitation centres go.

The success of seabird rehabilitation centres should be measured by their output of the improvement in the status of seabirds. During the evaluation by the government, economic instruments such as taxation and subsidies may be used to incentivise these facilities. This is because care and cost have been identified as important factors that affect the welfare of the species during hospitalisation (Molina-López et al. 2015). Adequate funding is required for the seabird rehabilitation centre operation. A cost-benefit analysis and the potential sources of funding needs to be conducted for South African seabird rehabilitation centres. This needs to include the time seabirds stay in rehabilitation; quality of care received; release rate; and monitoring. With the fiscal constraints that government is currently facing, the prospect of a potential subsidy for these facilities by the government may be unlikely. Perhaps there needs to be some consideration of the provision in the Policy on the Management of Seals, Seabirds and Shorebirds (RSA, 2007b), under Section 4.1.10 on Pollution that guards against the proliferation of rehabilitation facilities and the costs associated with their functioning. If targets are not set with the industry, the exorbitant cost of wildlife rehabilitation may ultimately compromise, the quality of care. This may assist in ensuring that seabird rehabilitation centres are sufficient and self-sustaining.

Strategic locations of seabird rehabilitation facilities, based on scientific evidence, is crucial to allow for the even distribution of these facilities along the country's

coastline. Such a target will not only level the playing field for rehabilitation centre funding but also ensure the quality of care for seabirds. The geographical spacing of such rehabilitation centres is pertinent to safeguard against disease outbreaks in facilities as well as in the wild. These geographical spaces between the seabird rehabilitation centres also need to encourage connectivity for easy movement of species during disasters such as oil spills. It is imperative that research questions be formulated to address the appropriate number of seabird rehabilitation centres across South Africa's coastline and where they should be located. Both facilities and government need to partner with universities to ensure the production of high-quality outputs that will address some of the pertinent issues also while training individuals that can serve the industry. Section 4.1.10 of the P: MSSS (2007) also specifies that "specific rehabilitation centres should be identified to take the lead in the care and rehabilitation of seabirds". This can be done if clear government support exists, but may otherwise be burdensome in some facilities. There are advantages to this approach, in that there would be a long-term plan for preparedness and alertness in case of emergencies (Fraser and Moss, 1985); and facilities with capable equipment, expertise and personnel can easily link up with others.

Contrariwise, limiting the number of rehabilitation centres may discriminate against new organisations that wish to rehabilitate seabirds. Therefore, a criterion needs to be set that would restrict the number of seabird rehabilitation, prevent the proliferation of wildlife rehabilitation as well as minimise facilities that may offer a low quality of care. However, small rehabilitation centres can be used to support major rehabilitation centres through various tasks such as providing educational programs, handling routine cases, manage reintroductions and collecting clinical data (Fraser and Moss, 1985). Major rehabilitation centres can be used to provide skills and training to small facilities. The literature on seabirds abounds with factors that contribute to their decline (Ferraro, 2009); these can be used to formulate criteria along with the help of skilled seabird rehabilitators.

CONCLUSION

In mapping the way forward, a clear policy objective will address key issues affecting seabird rehabilitation and will ensure the reform of this sector. If the objective is to set the standard with regards to the quality of care in rehabilitation centres; then an

enabling policy environment would encourage facilities to uphold these standards, and look at means to addressing facilities' budget constraints. Policy makers in the country need to be cognisant of various options and, in some cases, combine the various tools to make it appropriate for the different facilities to meet the standards.

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APPENDIX 1

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Questionnaire on the Seabird Rehabilitation Centres and Captive Institutions

** The aim of the questionnaire is to understand the processes and challenges that seabird rehabilitation centres and captive institutions face to assist in the conservation of seabirds.*

Name of the Rehabilitation or Captive facility:

Years in operation:

Type of Facility:

<input type="checkbox"/>	Captive Breeding Operation	Scientific Institution	<input type="checkbox"/>
<input type="checkbox"/>	Sanctuary	Rehabilitation Facility	<input type="checkbox"/>
<input type="checkbox"/>	Commercial Exhibition Facility	Other (please Specify):	<input type="checkbox"/>

Section A: General (7 min)

1. *What are the major responsibilities and functions of the facility (according to order of importance)*

High =5, Very Good =4, Satisfactory =3, Fair =2, Minimal =1

(a) Caring and helping of injured/orphaned seabirds with the aim of releasing them back into the wild.	1	2	3	4	5
(b) Provide education about seabirds with the aim of increasing compassion for seabirds.	1	2	3	4	5
(c) Manage the interaction between seabirds and people	1	2	3	4	5
(d) Seabird conservation	1	2	3	4	5
(e) Seabird disease surveillance	1	2	3	4	5

Other (please specify): _____

2. What is the size of the establishment?

3. Indicate the number of people employed:

Full time	Part-time	Casual	Other

4. What are the challenges facing the facility?

High =5, Very Good =4, Satisfactory =3, Fair =2, Minimal =1

(a) Lack of money for facilities/supplies/staff	1	2	3	4	5
(b) Lack of trained staff	1	2	3	4	5
(c) Lack of government support and subsidy	1	2	3	4	5
(d) Inadequate media coverage	1	2	3	4	5
(e) 'Public drop offs'	1	2	3	4	5
(f) Lack of knowledge of post-release survival	1	2	3	4	5
(g) Lack of norms and standards for rehabilitation centres	1	2	3	4	5
(h) Strict permit conditions	1	2	3	4	5
(i) Lack of available release habitat	1	2	3	4	5
(j) High post-release mortality	1	2	3	4	5
(k) Lack of research	1	2	3	4	5

Other (please specify): _____

5. Are there guidelines/operating procedures governing the operation of the facility (please specify)?

YES	NO	
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6. Do you think that rehabilitation and captive facilities would benefit from guidelines and/or minimum standards for seabird rehabilitation, e.g. standards for cleaning, disease control, enclosures, euthanasia, release criteria and record keeping?

YES	NO	
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Other (please specify): _____

7. Do you think that the issuing and enforcement of permits is:

Excellent (High) = 5, Very Good = 4, Satisfactory = 3, Fair = 2, Poor (Low) = 1

(a) Important and functioning correctly	1	2	3	4	5
(b) Could be important, but is not being enforced properly and permit conditions are not strict enough	1	2	3	4	5
(c) Not useful and even a hindrance to doing rehabilitation	1	2	3	4	5

Section B: Collection of Animals (10 – 15 min)

1. Where do you receive animals from?

2. What common seabird species are being brought into the facility (List 5)?

(a)
(b)
(c)

(d)
(e)

3. *What is your annual intake of seabirds?*

(a) >100	b) 75 - 99	c) 50-74	d) 25-49	e) < 25	f) I don't know
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4. *Please list 5 main causes that result in seabirds being brought to your facility.*

(a)
(b)
(c)
(d)
(e)

5. *Do you mark the animals that get into the facility?*

YES	NO
-----	----

Other (please specify):

6. *Are the seabirds permanently marked before release e.g. numbered rings, transponders?*

YES	NO
-----	----

Other (please specify):

7. *What are the procedure and processes followed when a wild seabird is admitted to your facility?*

- (a) Accept and admit for rehabilitation and eventual release
- (b) Accept and transfer to another rehabilitation facility (please specify)
- (c) Accept and euthanize these seabirds
- (d) Do not accept and refer to another rehabilitation centre (please specify):

8. *Main reasons why seabirds cannot be released into the wild:*

High =5, Very Good =4, Satisfactory =3, Fair =2, Minimal (Low) =1

Euthanasia	1	2	3	4	5
Transfer to a sanctuary or captive facility (e.g. zoo)	1	2	3	4	5
Give to permit-keeping members of the public	1	2	3	4	5
Kept at your centre for educational purposes	1	2	3	4	5
Kept at your centre for breeding purposes	1	2	3	4	5
Kept at your centre for rearing young	1	2	3	4	5

Other (please specify):

9. *Common reasons why your facility euthanizes seabirds?*

Most common reason =5, Very Good reason =4, Satisfactory reason =3, Fair reason

=2, *Least common reason* =1

(a) When the animal has non-repairable injuries	1	2	3	4	5
(b) There are no resources to care for the seabird	1	2	3	4	5
(c) The animal is an exotic species	1	2	3	4	5
(d) The animal is a common species	1	2	3	4	5
(e) The animal is in poor condition	1	2	3	4	5
(f) Problem seabirds	1	2	3	4	5
(g) Potentially diseased	1	2	3	4	5
(h) Heavily infested with ecto- and endoparasites	1	2	3	4	5

Other (please specify):

10. If your centre does not euthanase animals, which of the following reasons influence your decision the most:

High =5, *Very Good* =4, *Satisfactory* =3, *Fair* =2, *Minimal* =1

(a) Public opinion	1	2	3	4	5
(b) Facility's policy	1	2	3	4	5
(c) Permit regulations	1	2	3	4	5
(d) Funding sources	1	2	3	4	5
(e) Lack of resources to perform euthanasia	1	2	3	4	5

Other (please specify):

11. Do you have a veterinarian at your Centre?

YES	NO
-----	----

Other (please specify):

12. Do you do any ongoing health/disease checks on the seabirds at your facility?

YES	NO
-----	----

Other (please specify):

13. Do you have a quarantine policy?

YES	NO
-----	----

Other (please specify):

Section C: The release (10 min)

1. How many seabirds are released per year?

(b) >100	g) 75 - 99	h) 50-74	i) 25-49	j) < 25	k) I don't know
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2. What are the main species being released (List 5)?

(a)
(b)
(c)
(d)
(e)

3. What are the common reasons seabirds are **not** released back into the wild:

Most common reason =5, Very Good reason =4, Satisfactory reason =3, Fair reason =2, Least common reason =1

(a) It is an exotic species	1	2	3	4	5
(b) There is no suitable habitat for release	1	2	3	4	5
(c) It is blind/deaf	1	2	3	4	5
(d) It only has 1 leg / 1 wing	1	2	3	4	5
(e) It cannot walk/fly	1	2	3	4	5

Other (please specify):

4. On average what percentage of your releases do you consider to be successful?

l) 100%	m) 75%	n) 50%	o) 25%	I don't know, we don't do any post-release monitoring
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Other: (please specify)

5. What factors resulted in successful releases?

High =5, Very Good =4, Satisfactory =3, Fair =2, Minimal =1

(a) Age of animal	1	2	3	4	5
(b) Wild bred	1	2	3	4	5
(c) If applicable: age and sex structure of the group	1	2	3	4	5
(d) Soft release (supplementary feeding and/or holding cage)	1	2	3	4	5
(e) Hard release	1	2	3	4	5
(f) Time of year, i.e. food and water availability	1	2	3	4	5
(g) Suitable habitat	1	2	3	4	5
(h) Good support of landowners	1	2	3	4	5
(i) Lessons learnt from previous releases	1	2	3	4	5

Other: (please specify)

What factors resulted in unsuccessful releases (Top 5)?

High =5, Very Good =4, Satisfactory =3, Fair =2, Minimal =1

(a) Age of animal	1	2	3	4	5
(b) Captive-raised	1	2	3	4	5

(c) If applicable: age and sex structure of the group	1	2	3	4	5
(d) Soft release (supplementary feeding and/or holding cage)	1	2	3	4	5
(e) Hard release	1	2	3	4	5
(f) Time of year, i.e. food and water availability	1	2	3	4	5
(g) Unsuitable habitat	1	2	3	4	5
(h) No support from landowners	1	2	3	4	5
(i) First release of this animal species	1	2	3	4	5
(j) Natural disaster (e.g. flood/drought)	1	2	3	4	5
(k) Other (please specify)	1	2	3	4	5

Section D: Finance (5 min)

1. *Where does the majority of your annual funding come from?*

Large proportion =5, Very Good proportion =4, Satisfactory proportion =3, Fair proportion=2, Minimal proportion =1

(a) Public donations	1	2	3	4	5
(b) Private donor	1	2	3	4	5
(c) Corporate sponsorship	1	2	3	4	5
(d) Government subsidy	1	2	3	4	5
(e) Own money	1	2	3	4	5
(f) Other	1	2	3	4	5

2. *How much of your current annual budget is spent on the following items?*

(High = 5, Very Good = 4, Satisfactory = 3, Fair =2, Low = 1)

(a) Food for animals	1	2	3	4	5
(b) Housing of animals	1	2	3	4	5
(c) Veterinary procedures	1	2	3	4	5
(d) Equipment	1	2	3	4	5
(e) Staff salary	1	2	3	4	5
(f) Release of animals-transport	1	2	3	4	5
(g) Post-release support (food/shelter)	1	2	3	4	5
(h) Post-release monitoring	1	2	3	4	5
(i) Rescues	1	2	3	4	5
(j) Fundraising	1	2	3	4	5

Section E: Legislative Requirements (10 min)

Provide your views on:

1. Permitting Process:

Excellent (High) = 5, Very Good = 4, Satisfactory = 3, Fair =2, Poor (Low) = 1

(a) Multiple permitting process required	1	2	3	4	5
(b) Whether the Integrated permitting process is effective	1	2	3	4	5
(c) Quality of permit conditions	1	2	3	4	5

2. Facility Inspections by regulatory authorities:

Excellent (High) = 5, Very Good = 4, Satisfactory = 3, Fair =2, Poor (Low) = 1

(a) Quality of inspections	1	2	3	4	5
(b) Knowledge of officials regarding facilities	1	2	3	4	5
(c) Auditing of facilities	1	2	3	4	5
(d) Reporting on facility specific challenges by regulators	1	2	3	4	5

3. *Legislation:*

(a) Current legislation pertaining to the management of seabirds in rehabilitation centres and captive institutions:

(b) How legislation and regulators can assist in improving the quality of care in rehabilitation centres and captive institutions

APPENDIX 2



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CONSENT TO PARTICIPATE IN RESEARCH

You are asked to participate in a research study conducted by Ms. Millicent Makoala, from the Environmental Management Department under the Public School of Leadership at Stellenbosch University. You were selected as a possible participant in this study because your opinion and experience in the field of seabird rehabilitation and seabird captivity is deemed to be important to the future of the seabird populations in South Africa.

1. PURPOSE OF THE STUDY

The purpose of this study is to look at how the environmental legislation can help improve the management of seabirds as well as rehabilitation and captive institutions to aid in seabird conservation efforts.

2. PROCEDURES

If you volunteer to participate in this study, we would ask you to do answer the following survey, truthfully, and completely.

3. POTENTIAL RISKS AND DISCOMFORTS

If at any time you feel discomfort in answering the survey questions, you may terminate the survey.

4. POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

The benefit of this survey will be to gain an understanding regarding the operations of seabird rehabilitation and of those kept in captivity. This will assist regulatory authorities to better align the policy frameworks to aid and minimize the current confusing, yet cumbersome legislative process.

5. PAYMENT FOR PARTICIPATION

There will be no payment for participation in this study.

6. CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law. Confidentiality will be maintained by (a) completely anonymous collection of the data (i.e. no requirement for name, personal identification number, date of birth, etc. on any form; (b) the information will be kept in a secure location on campus.

7. PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You may also refuse to answer any questions you don't want to answer and still remain in the study. The investigator may withdraw you from this research if circumstances arise which warrant doing so.

8. IDENTIFICATION OF INVESTIGATORS

If you have any questions or concerns about the research, please feel free to contact Ms. Millicent Makoala on 072 337 1474.

9. RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your rights as a research subject, contact Ms Maléne Fouché [mfouche@sun.ac.za; 021 808 4622] at the Division for Research Development.

SIGNATURE OF RESEARCH SUBJECT OR LEGAL REPRESENTATIVE

The information above was described to [me/the subject/the participant] by [name of relevant person] in [Afrikaans/English/Xhosa/other] and [I am/the subject is/the participant is] in command of this language or it was satisfactorily translated to [me/him/her]. [I/the participant/the subject] was given the opportunity to ask questions and these questions were answered to [my/his/her] satisfaction.

[I hereby consent voluntarily to participate in this study/I hereby consent that the subject/participant may participate in this study.] I have been given a copy of this form.

Name of Subject/Participant

Name of Legal Representative (if applicable)

Signature of Subject/Participant or Legal Representative

Date

SIGNATURE OF INVESTIGATOR

I declare that I explained the information given in this document to _____ [*name of the subject/participant*] and/or [his/her] representative _____ [*name of the representative*]. [*He/she*] was encouraged and given ample time to ask me any questions. This conversation was conducted in [*Afrikaans/*English/*Xhosa/*Other*] and [*no translator was used/this conversation was translated into* _____ by _____].

Signature of Investigator

Date

APPENDIX 3

24. Compulsory conditions applicable to captive breeding facilities, rehabilitation facilities, temporary holding facilities and exhibition facilities

- (1) In addition to the conditions contemplated in regulation 23(1) and (2), a permit in respect of a captive breeding facility, rehabilitation facility, temporary holding facility or an exhibition facility must be issued subject to a condition that the permit-holder must—
 - (a) prevent hybridisation and inbreeding;
 - (b) participate in any national or regional studbook approved by the department, including the—
 - (i) marking of specimens; and
 - (ii) collection of DNA samples for genotyping to determine the parental lineation;
 - (c) keep a stock book, in the case where a studbook for the species to which the permit relates, is not available;
 - (d) provide information contemplated in paragraphs (a), (b) and (c) in writing to the issuing authority prior to the expiry of the ordinary permit or standing permit;
 - (e) make the information contemplated in paragraph (d) available upon request to the issuing authority; and
 - (f) in the case of a captive breeding facility or exhibition facility that no specimens of the following listed threatened or protected marine species originating from wild populations may be introduced in an exhibition facility or captive breeding facility—
 - (i) dolphins;
 - (ii) whales;

- (iii) seals;
 - (iv) sea birds;
 - (v) saw fish;
 - (vi) coelacanth; and
 - (vii) white sharks, basking sharks and whale sharks.
- (2) Notwithstanding sub-regulation (1)(a), inbreeding may be permitted in a captive breeding facility for conservation purposes, only in accordance with a conservation strategy approved by the issuing authority, provided that—
 - (a) a studbook contemplated in sub-regulation (1)(b) is kept; and
 - (b) a stock book contemplated in sub-regulation (1)(c) is kept.
- (3) A permit issued in respect of a rehabilitation facility must be subject to a condition that a specimen of a listed threatened or protected marine species, to the extent possible, may not be kept for a period that exceeds the period that is reasonably required for the rehabilitation of such specimen.
- (4) If a specimen of a listed threatened or protected marine species contemplated in sub-regulation (3) would be incapable of becoming self-sustainable upon release from the rehabilitation facility, such specimen must be transferred to a registered sanctuary or must be euthanized.
- (5) The stock book contemplated in sub-regulation (1)(c) must contain the following information—

- (a) quantities and sex of specimens acquired, whether such specimens were born in the facility, purchased, received as a donation or a new loan, or a loan returned;
 - (b) quantities and sex of specimens kept;
 - (c) quantities and sex of specimens disposed of, whether such specimens died, were sold, or given as a donation or a loan.
- (6) The issuing authority may determine the conditions relating to the fate of a specimen of a listed threatened or protected marine species where the rehabilitation of such specimen is not possible.